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## INFECTIOUS MONONUCLEOSIS: A PROBLEM IN DIAGNOSIS.[1]

By T. E. HESTER SPARK,
*Sydney.*

THERE must be few amongst us who have not at some time been worried by the puzzling signs and symptoms exhibited by a child or young adult who appears to be seriously ill, and who yet defies our best efforts to place him comfortably in any diagnostic pigeon-hole. Such cases have frequently declared themselves as infectious mononucleosis, but not until all concerned have spent several uncomfortable days of doubt.

The difficulty in diagnosis is due largely to the great variability in clinical manifestations exhibited by this disease, for it can closely simulate many different conditions, which bear no relationship to each other. Furthermore, though it has such a benign prognosis, most of the conditions that it mimics are of much more serious import, and it is therefore a matter of considerable importance to establish the diagnosis at the earliest possible moment.

These are the facts which have guided me in the selection of this subject, and attention will therefore be directed especially to the question of diagnosis, though the other aspects of the disease will receive due consideration. The clinical basis for the paper is provided by a small series of cases, some of which occurred at Sydney Hospital and others in private practice. Brief case notes are appended, and reference to them will be made from time to time.

The condition now almost universally referred to as infectious mononucleosis is no newcomer to the field of medical knowledge, for some of its most conspicuous features were described more than fifty years ago. However, it is only within recent years that its unusual hæmatological and serological manifestations have seen the light of day, and it is this fact which is probably responsible for the widespread reawakening of interest in this peculiar malady.

### Definition.

Infectious mononucleosis may be defined as an acute febrile illness with a benign prognosis, characterized by the great variability of its clinical signs and its typical hæmatological changes. Let us not, however, fall into the error of regarding it as primarily a disorder of the blood, for though the changes in the blood are typical, it would seem much more likely that we are dealing with a generalized reaction to infection on the part of the organism.

### Historical.

The earliest reference to the condition in medical literature is Emil Pfeiffer's description of its clinical manifestations, which was published in 1889 under the title of *"Drüsenfieber"*.[(1)] His description was wholly admirable, for he noted with care almost all the outward and visible signs which are recognized at the present day; but he made one rather conspicuous error in the light of recent knowledge, and that was his statement that the axillary and inguinal glands are not affected. We now know that although the cervical glands are probably the most commonly affected, the axillary and inguinal and even the thoracic and abdominal glands do not always escape.

In 1908 Pfeiffer made a further contribution to the literature of this subject; but as Letheby Tidy says in his Lumleian lectures of 1934: "He added nothing of importance. No one discussed it, and no notice was taken of it."[(2)]

From 1906 to 1920 glandular fever appears to have attracted little notice, and there is a dearth of references

[1] Read at a meeting of the Section of Medicine of the New South Wales Branch of the British Medical Association on August 13, 1942.

to it in the literature of this period. Turk, in 1907,[2] reported a case which attracted some attention by reason of the dramatic account of his surprise on meeting the patient in the street two weeks after he had given a hopeless prognosis.

Several cases were reported in the years 1907 to 1914; but in the latter year Breinl, Priestley and Fielding published in THE MEDICAL JOURNAL OF AUSTRALIA an account of a disease closely resembling glandular fever, to which they referred as "endemic glandular fever in the Mossman district".[3]

The next important contribution came from Sprunt and Evans in America, in 1920.[4] They published an article in which they noted throat symptoms, glandular enlargement, palpable spleen and the invariably favourable prognosis. They named the condition "infectious mononucleosis" for the first time, but made no reference to the glandular fever spoken of by the older writers. In fact, the identity of the two conditions was apparently denied for some time in America.

In 1921 Tidy and Morley recorded the first case diagnosed as glandular fever, in which a lymphocytosis was recognized,[5] and Tidy remarks that on reading Sprunt and Evans's article, they were satisfied that glandular fever and infectious mononucleosis were one and the same thing.

From 1920 to 1930 the continental authorities appear to have been occupied with discussing "monocytic angina" and the "lymphatic reaction" without realizing the identity of these conditions with mononucleosis. They appear to have thought that the lymphocytosis was the result of a "constitutional lymphatic tendency" in the subject, resulting from throat infection. This theory has been exploded, however, by the appearance of a normal granulocytic response to acute infection in subjects who have recovered from infectious mononucleosis.[12]

In 1932 Paul and Bunnell reported in *The American Journal of the Medical Sciences* the results of their discovery of the presence of heterophile antibodies in the serum of patients suffering from infectious mononucleosis.[13] They pointed out that the discovery was entirely fortuitous and occurred when they were investigating the possible presence of heterophile antibodies in acute rheumatism. One of their control group of patients was found to have a high titre of sheep cell agglutinins in his serum, and on further investigation he was found to have infectious mononucleosis. These workers then searched through large numbers of other conditions in their attempt to find heterophile antibodies, and with the exception of those present in serum sickness, the search was fruitless. Their work will be discussed at more length, as it has such a profound bearing on present-day knowledge.

In 1934 H. Letheby Tidy selected the subject of infectious mononucleosis for his Lumleian Lectures,[14] and in them he gave a comprehensive review of the position at that time, making special reference to the English epidemic of 1934 and classifying the disease into three main types.

A more recent review of the subject was given by Alan Bernstein and published in *Medicine* in 1940.[15] This is a most comprehensive article and will doubtless serve for many years as a reference for those interested in the subject.

## Distribution.

Ever since the condition was first described, it has been well recognized that infectious mononucleosis is essentially a disease of youth. In Pfeiffer's original report of 24 cases, 15 of the patients were aged under thirteen years, and in Longcope's series all the patients were aged under thirty years.[11] Since then most authors have emphasized the predilection of the condition for children and young adults. It has been reported in patients aged up to seventy years; but this is a rare occurrence, and is almost certainly an instance of older people suffering from an infection of childhood as a result of isolation with increased susceptibility.[16]

As regards sex incidence, the condition appears to be slightly more common in males,[2] though in the absence of an epidemic or a large series of sporadic cases it is difficult to be certain on this point.

A large percentage of recorded cases appears to have occurred amongst medical students and nurses. In fact, in Baldridge's series[6] of fifty cases, there were 34 medical students and two physicians. The explanation of this fact would appear to lie more in the accuracy of diagnosis than in any increased susceptibility of these classes of people, for amongst the members of the lay public there are doubtless many who never seek medical advice.

Climatic conditions and geographical situation appear to be unimportant factors, for the disorder has been reported from most parts of the world, and although American reports state that it is more common in the autumn, the evidence on this point is somewhat unconvincing.[2]

Inquiry into the incidence of the disease in Sydney brought to light some interesting facts. Sydney Hospital records indicate that there have been nine in-patients in the last twenty-two years with a diagnosis of glandular fever or infectious mononucleosis. The Royal Prince Alfred Hospital had only seven such patients in thirty-two years; and at the Royal Alexandra Hospital for Children I was able to find no record of an in-patient having such a diagnosis.

This, of course, is not a true index of the frequency of the disease, for the vast majority of such patients do not find their way into the wards of a public hospital, as the disease usually escapes recognition. Moreover, if the correct diagnosis is made, the patients are not deemed to be ill enough to require admission to hospital.

One very curious feature of these in-patient records, however, was apparent, and that was the fact that the earliest case recorded at Sydney Hospital occurred in 1934, and the earliest at Royal Prince Alfred Hospital in 1937. Are we to assume that no cases occurred before these dates? Or is it not more likely that such cases appeared from time to time, but escaped recognition? It is true that the heterophile agglutination test was described by Paul and Bunnell only in 1932, and this undoubtedly led to the making of a diagnosis in many cases that would otherwise have been "missed". However, the characteristic hæmocytological findings were well known many years earlier than this, and it seems strange that no cases were known to have occurred in this period. It is possibly an indication of the lack of interest in this subject prior to Paul and Bunnell's work—an interest, as has already been noted, which has expanded enormously with the identification of the many forms of the disease.

## Ætiology.

The earliest authorities and most subsequent writers have all considered that glandular fever is the result of an infective process. Many efforts have been made in the way of animal experiments to establish the identity of a causative organism. However, the results have so far been disappointing, and the subject still awaits illumination.

Breinl and others[3] reported that in the endemic glandular fever of north Queensland they injected ten cubic centimetres of blood from infected patients into monkeys, and thereby succeeded in producing in them a fever together with enlargement of glands. These experiments were carried out with adequate controls, but unfortunately there is no mention of hæmatological investigation, which may perhaps have thrown some light on the subject.

One of the most interesting and apparently significant animal experiments is the recent work of Wising.[18] He injected emulsions of lymph nodes from infected patients into monkeys, and thereby produced a febrile illness characterized by glandular enlargements, a normal number of leucocytes and a slight increase in mononuclear cells. The disease was transmissible from monkey to monkey. A laboratory worker contracted infectious mononucleosis after pricking his finger with a knife which had been in contact with a gland from one of the animals. The Paul-Bunnell test was not carried out on the monkeys, but the accidentally infected human being provided a positive reaction.

Recently Nyfeldt cultivated a small Gram-positive bacillus from the blood of human patients, which he called *Bacillus monocytogenes hominis*. Subsequently he and Schmidt[28] grew the same organism from the cerebrospinal fluid of four out of five patients suffering from infectious mononucleosis, only one of whom gave clinical evidence of meningitis. Nyfeldt's bacillus is a species of the genus *Listerella*, which occasionally produces meningitis in man. Unfortunately, however, the known clinical manifestations of *Listerella* infections do not resemble infectious mononucleosis.

It is apparent from the foregoing remarks that the immediate cause of this condition is obscure. There is, however, sufficient evidence to state that it is an infective process.

## Pathology.

It has long been recognized that the pathological approach is the surest way to understanding in obscure medical conditions. However, when we come to consider such an entity as infectious mononucleosis, we are at once confronted with an insuperable difficulty, because the universally benign prognosis precludes the study of autopsy material. Only one or two post-mortem examinations have been reported in the literature, and the conclusions in these instances do not carry conviction, as the patients have usually died from a secondary infection complicating the original condition.

The only other avenue of approach available is the excision and examination of the affected lymph nodes. Several reports on this subject exist in the literature. Pratt[17] removed two glands from himself, one in the acute stage of the illness and the second one twelve months later. Examination of the first of these revealed lymphoid hyperplasia, early vascular degeneration, hæmorrhages and pronounced reticulo-endothelial proliferation with areas of central necrosis. Examination of the second node, which was fibrotic, still revealed considerable evidence of reticulo-endothelial hyperplasia.

The patient in Case X of the present series was subjected to biopsy; Dr. R. M. Rawle removed an enlarged gland from the left groin about eight weeks after the acute phase of the illness had subsided, and Dr. A. J. Canny's report on the sections is as follows:

> There is extensive early fibrosis of the medullary tissue of the lymph node. Among the newly formed connective tissue elements, partially obliterated sinuses still showing evidence of sinus catarrh can be distinguished. Large numbers of newly formed blood vessels are present in the young connective tissue. The lymphoid follicles are clearly defined and unaffected by the fibrosis. In many of them there is a central zone of reactive hyperplasia. There are no specific changes to distinguish this condition from any unspecific chronic lymphadenitis except that the follicular structure is so well preserved in comparison with the medullary and sinus systems.

Other tissues examined by various workers have included the tonsil[6] and bone marrow, and these have simply shown a predominance of mononuclear cells, which is in accordance with what one might expect and not really significant.

## Clinical Manifestations.

It has been truly remarked that syphilis is the greatest mimic known to medicine. It is equally true that in this respect infectious mononucleosis resembles syphilis, for there are few diseases that produce such a variety of apparently dissimilar symptom complexes.

Attempts have been made to divide the disease into definite types, and Tidy has described the adult variety as appearing in three well recognized forms: (i) glandular, (ii) anginose and (iii) febrile.[30] This tends to simplify the discussion for teaching purposes; but in practice it is found that the disease is so protean in its manifestations that many cases do not fit into arbitrarily defined types. In fact, it is so variable in its method of attack that at times it defies our best efforts at diagnosis, let alone our ability to classify it into a particular type.

It would seem that the only factor common to all forms of the disease is an increase in the non-granular elements of the blood; it is this fact which has led to the present concept of infectious mononucleosis as a single clinical entity with many different manifestations, rather than as a group of obscure diseases whose identity was always a matter of doubt.

It has been remarked that it is essentially a disease of children and young adults, and though great variations occur in all cases, certain peculiarities are common to small children, whilst other features are more common in the adult cases.

When the disease assumes epidemic form, cases differ from those occurring sporadically; in the epidemic variety it is usually less severe than in sporadic cases.

In children, it is often found that the onset is more acute than in adults, and the disease appears to run a more typical course, glandular enlargements being a conspicuous feature, and sore throat or tonsillitis a frequent accompaniment. The blood count of children above the age of seven years is usually the same as that of adults; but in the case of infants the number of leucocytes may sometimes exceed 40,000[30] per cubic millimetre.

### *Types.*

The disease in adults shows the factor of variability of symptoms in its fully developed form. I have remarked earlier on Tidy's classification of it into glandular, anginose and febrile types. Other writers have referred to the "hæmorrhagic type" or the "icteric type", or have even classified the types according to the group of glands involved—for example, "abdominal", "thoracic" or "inguinal". Such efforts at artificial division are arbitrary, and we are on much surer ground if we adhere to our basic principle of mononuclear increase with variable clinical manifestations.

### *Incubation Period.*

There is great divergence of opinion on the question of the incubation period, and variations from one day to four weeks have been mentioned by different writers. One author, however, reported a case occurring eleven days after a single exposure to infection had taken place.[3] It is therefore considered that this is the most likely figure, though conclusive proof on this point is still lacking.

### *Mode of Onset.*

There is no typical mode of onset, and one finds every variety of symptom, from the most insidious to the most fulminating. In the majority of the cases the slow onset is characterized by vague constitutional disturbances, such as malaise, nausea and anorexia, which are typical of any febrile illness. It may, however, be ushered in by a shivering attack and sudden rise of temperature before there are any localizing signs.

### *Duration.*

In most cases the illness pursues an acute febrile course for periods varying from a few days to a few weeks. Seldom does it exceed one month in duration, though cases are encountered now and then in which it pursues an intermittently febrile course for anything up to six months. Hæmatological changes may persist for many years, as also may glandular and splenic enlargement.

### *General Symptoms.*

As has been remarked earlier, there is no characteristic symptom complex, and it is impossible to describe a typical case, for there is no such thing. It is, however, not uncommon for the febrile stage to be ushered in with shivering or sweating. Headache and dizziness are common complaints; but the general sense of malaise frequently appears to be quite disproportionate to the clinical findings. Weakness and loss of appetite are also common, and there is frequently a history of "cold in the head", "sore throat" or other typical symptoms of infection in the upper respiratory passages.

Sore throat is of such frequent occurrence that it merits special attention. The majority of patients have symptoms

referable to their throat in the earlier stages of the infection, and these vary from slight degrees of pharyngitis with mild dysphagia, to acute ulcerating lesions with the formation of membrane, pus and sloughs.

Bernstein describes four characteristic types as occurring in his cases:[3] (i) diffusely injected throat, 34%; (ii) follicular tonsillitis or pharyngitis, 4%; (iii) ulcerative pharyngitis, 19%; (iv) membranous pharyngitis, 7%.

Symptoms referable to the throat were noted and well recognized by the older generation of physicians; but in the majority of cases the disorder was regarded as primarily an infected throat, with a cervical adenitis occurring in consequence of the pharyngeal focus. It was not appreciated that the cervical glandular enlargements were merely one phase of a generalized infection, and that the local lesions in the throat were incidental.

The lesion has repeatedly been mistaken for pharyngeal diphtheria,[3a] and this occurred also in the present series. Cultures from the throats of patients in Sydney Hospital produced hæmolytic streptococci, *Streptococcus viridans*, *Staphylococcus aureus* and Vincent's spirilla. These findings are probably not significant, as all these organisms are found apart from mononucleosis, though the presence of Vincent's organisms has been noted so often by other writers that one wonders whether its association may not be more than mere coincidence. Patients not infrequently complain of pain in the neck, together with the painful throat resulting from these infections. The pain is usually at the back or sides, and it may be of sufficient severity to raise the question of meningitis, though it is usually found to originate from enlarged and tender glands, especially in the posterior cervical group.

*Abdominal Pain.*—Abdominal pain has been noted by some authors as a conspicuous feature, and though this was not observed in the cases at Sydney Hospital, it appears to be of sufficiently frequent occurrence to merit consideration. Cases are mentioned[10] in which patients have been subjected to surgical removal of an allegedly acutely inflamed appendix, and in which it was found when they were convalescing from their unnecessary operation that they were suffering from infectious mononucleosis. It has been suggested that abdominal symptoms are due to involvement of the mesenteric lymph nodes, and though proof is lacking, this appears to be a reasonable assumption.

### *Signs.*

*Temperature and Pulse Rate.*—The febrile reaction is probably the most consistent feature of this disease. It usually appears suddenly, and with daily increments reaches a peak in from three to five days. Frequently it is of the remittent form with evening rises of temperature, and subsequently subsides within a period of two to four weeks. This, however, is by no means always the case, for Tidy and Morley[11] have observed the disease to run an entirely afebrile course, and I can recall one case in which it ran an intermittently febrile course for many months. Temperatures as a rule do not reach high levels, though in most cases at the maximum they exceed 102° F.

A rather typical feature of the febrile reaction is the secondary rise in temperature, after a return to normal, associated with generalized involvement of glands. This was well shown in Case X of the present series; the patient left hospital with a normal temperature three days after his illness has begun, only to be readmitted the next day with a secondary rise of temperature, generalized glandular enlargement and an acute exacerbation of symptoms.

The pulse rate is usually increased in direct proportion to the temperature, though cases occur from time to time in which one finds an increased temperature associated with a disproportionately slow pulse rate. Concerning the London epidemic, Gooding[7] makes the following remarks:

> The pulse rate was, in uncomplicated cases, slower than would have been expected in view of the temperature. A pulse rate of 92 with a temperature of 102° was the rule rather than the exception.

Bernstein[3] reports a case in which a temperature of 103·4° F. was associated with a pulse rate of 84 per minute, and states that "the pulse was sufficiently dicrotic in character to suggest a tentative diagnosis of typhoid fever".

*Glandular Involvement.*—Glandular involvement is probably the most widely recognized sign in infectious mononucleosis, and yet, like other marks of identification, this is conspicuous for its variability. Some patients have generalized and obvious glandular enlargement; others have no apparent involvement of glands; and between these extremes one finds every possible variation. By far the most common site of glandular enlargement is the cervical group, especially those lying deep to the sterno-mastoid and in the posterior triangle. As has been remarked earlier, this was the type of enlargement first described by Pfeiffer; but he overlooked the fact that other groups were frequently affected. After first appearing in the cervical glands, the enlargement may involve other groups, or conversely, it may appear first in the inguinal or axillary glands, and cervical swellings may appear later. This is well illustrated by Case X in which the patient first reported because of a single inflamed and painful gland in the left groin, and it was not until several days afterwards that enlarged glands appeared in other situations. Abdominal and thoracic involvement has been discussed by various authors, and Tidy[3b] mentions that in several cases he was able to palpate abdominal masses, which subsequently disappeared. This has not been a feature of the cases seen here, though some patients have complained of vague abdominal pains, which may have been due to mesenteric glandular enlargement, and others have been troubled by an irritating cough, which could be construed as evidence of thoracic glandular involvement. Case IX was of special interest, in that there was no evidence of glandular enlargement except for the right tonsillar gland, which was just palpable. It was not possible to exclude the chance that the gland may have been palpable long before the onset of this illness; but though an assiduous search was made each day for the appearance of other enlarged glands, it was not rewarded. Cases unassociated with obvious glandular enlargements have been mentioned before by Tidy,[3b] who stated that "in most of these there is evidence of involvement of mesenteric or mediastinal glands". It thus seems likely that while glandular enlargement may not be apparent, there is usually some involvement of the lymph nodes, and their non-discovery is evidence of the imperfection of our methods rather than proof of their non-existence. The involved glands, as has been remarked, may vary enormously in number and position. Likewise their size varies between wide limits, but the diameter is commonly less than two centimetres. The glands are usually ovoid in shape and rubbery in consistence. They may occur singly or in masses, but always remain discrete. They are usually freely mobile and not adherent to adjacent structures, and they may be painful on pressure.

Suppuration has been alleged to occur, especially by some of the older writers; but it seems more likely that such an occurrence is due to pyogenic coccal infections, rather than to a true infectious mononucleosis. It has been remarked that pyogenic cocci are not infrequently found in the pharynx of such patients, and it would appear probable that suppuration is due to invasion of the glands by these organisms. I am of the opinion that suppuration of glands does not occur in uncomplicated glandular fever, and that in the rare cases in which this phenomenon is seen, it is due to coincidence.

*The Spleen and Liver.*—Enlargement of the spleen is commonly observed. It was noted in five of the cases studied, and in one of them the spleen was distinctly tender. As a rule the enlargement is not excessive, the lower edge of the organ being usually palpable just below the costal margin. It must be remembered, however, that for the spleen to be palpable at all, it must have increased to approximately four times its usual weight, so that any enlargement apparent on clinical examination represents considerable changes in the organ. Like other signs in this disease, splenomegaly is extremely variable, and though it is an important diagnostic point when present, its absence must not be construed as evidence against the diagnosis.

Different authors report different percentages of positive findings, but a 50% incidence would appear to be a fair estimate of the frequency of this sign.

References to enlargement of the liver have been made in the literature from time to time, but this would appear to be of much less frequent occurrence than enlargement of the spleen. It was not apparent in any of the present series of cases, and though no significant conclusions can be drawn from such a small series, it is generally agreed that it is not a common sign. Whether enlargement of the liver, when present, is due to hepatitis or to congestion resulting from obstruction by enlarged glands, is not yet established; and the absence of autopsy findings renders it merely a matter for conjecture.

*Jaundice.*—Jaundice has been recorded in the past[32][33] as an exceedingly rare occurrence in infectious mononucleosis. Recently, however, further reports have been published[12] of cases in which jaundice of obscure origin was noted; the patients subsequently developed glandular enlargement and provided the typical hæmatological findings of infectious mononucleosis. The jaundice was of the regurgitant variety associated with bile in the urine, and though usually of short duration, in one case it lasted for ten days.

It has been stated that the jaundice is probably due to obstruction by enlarged glands in the portal fissure,[12] and though this is largely a question of academic interest, the existence of glandular fever as a possible cause of jaundice adds further difficulty to an already difficult diagnosis. The patient in Case IV of the present series was jaundiced for some days and provided an immediate direct positive reaction to the Van den Bergh test.

*Eruptions.*—Skin eruptions are of infrequent occurrence, but when present they tend to simulate those of other conditions. Whitby and Britton[26] make the following statement:

> Somewhere between the 4th and 10th day, a pinkish maculo-papular or rubelliform rash appears. The rash may resemble the rose pink spots of typhoid fever; it is distributed mainly on the front of the trunk. The spots fade in a few days, but further crops may appear.

Though the rash is most often of the typhoid variety, other rashes may occur, and morbilliform, scarlatiniform, urticarial and vesicular eruptions have been described.[3] No patient in this series exhibited a rash; but once again, this is probably the result of the small size of the series. One of our patients (Case X) showed a somewhat unusual sign in the form of œdema of the upper eyelids. This was transient, and disappeared within three or four days; but while it was present it was quite a striking feature. This patient also exhibited mild conjunctivitis, which also subsided fairly quickly without any local treatment. These phenomena have been noted by other writers,[3] but appear to be regarded as somewhat infrequent.

### Contagiousness.

The transmission of the disease from one person to another is a subject which still awaits illumination. The condition is known to occur in epidemics, and instances have been reported[31] in which more than one person in the same household has been affected. In no case of the present series was there any evidence to indicate the source of the infection, and it is a common experience for patients to be nursed in immediate proximity to other people without the appearance of additional cases.

These facts suggest the possibility of transmission by carriers, who show no sign of the disease themselves. However, at present the only definite statement that can be made is that the degree of contagiousness is low.

### Special Investigations.

Special methods of investigation that may assist in the diagnosis are confined to examination of the blood and bacteriological methods, and of these we are likely to get more helpful information from the former than from the latter.

Examination of the blood cells and serum provides our only positive evidence in diagnosis, and we must therefore consider this aspect of the subject in more detail.

#### *Examination of the Blood.*

The red cells show no significant departure from normal, and in uncomplicated cases no anæmia is present. Secondary anæmia, which may persist for several months during convalescence, has been reported,[30] and I have heard of a case in which anæmia was a conspicuous feature. This, however, is quite unusual, and it can be taken that as a rule there are no important changes affecting the red cells.

The number of platelets is usually within normal limits, though cases have been reported in which the platelets numbered as few as 45,000 per cubic millimetre.[4] These are not necessarily associated with hæmorrhagic phenomena. On the other hand, the hæmorrhagic diathesis may be conspicuous, although the number of platelets[9] is perfectly normal.

The bleeding time may be prolonged to as much as twenty-five minutes,[2] though the coagulation time is not changed. One of my colleagues has told me of difficulty in controlling post-operative hæmorrhage in the case of a patient who was subjected to tonsillectomy. It thus appears that the hæmorrhagic diathesis exists in some of the cases in the absence of thrombocytopenia, and so constitutes a pitfall for the surgeon.

Changes in the number and type of the white cells are unique, and represent one of our most effective aids to diagnosis. The development of an absolute lymphocytosis is the most characteristic feature, but the other white cells are affected also.

The total number of leucocytes is usually within or just exceeds normal limits, in the majority of cases being between 5,000 and 15,000 per cubic millimetre. In the present series of cases, in only one instance was the number more than 15,000 per cubic millimetre (23,040); this was of a transient nature, and within three days the number fell to 10,000 per cubic millimetre. Higher total numbers of leucocytes than these occur, and cases are mentioned in which the leucocytes number 40,000 and even 60,000 per cubic millimetre. The majority of these patients are young children and infants, and it is considered rare to find a total number of leucocytes of 20,000 or more per cubic millimetre in patients aged over seven years.[29] It should be noted that very high numbers with extreme mononucleosis (such as 99%), which are common in the leuchæmias, never occur in infectious mononucleosis.

It has been observed[28] that certain cases are characterized by granular leucocytosis in the initial stages of the disease, and the examination of the nuclei frequently reveals a "shift to the left". This feature has not been apparent in the present series, except in Case VI, in which a count of 77% neutrophile cells and 22% mononuclear cells in the early stages subsequently fell to 29% neutrophile cells and 61% mononuclear cells.

This early neutrophile leucocytosis may readily lead one away from the correct diagnosis, if it is not borne in mind as a possible prelude to the typical mononucleosis of the disease. It is, however, always transitory in nature, usually disappearing within a few days, and it never appears during the course of an established attack.

Occasionally a low number of leucocytes (below 4,000 per cubic millimetre) is found in the earlier stages.[28] It is due to diminution in the number of polynuclear cells, and the total number always rises later.

*Mononucleosis.*—Mononucleosis is the most characteristic and important feature of the blood picture, and is always present at some stage of the condition. It may appear even in the earliest period, though characteristically it shows up during the first four days and reaches a peak within ten days. In the majority of cases a mononucleosis of between 60% and 90% is found, though the morphological features of the cells are more important than their numerical variations, and the diagnosis rests more on the type of cells found than on their number. In this feature infectious mononucleosis resembles the leuchæmias, for in the latter conditions we sometimes encounter the aleuchæmic phase, in which we are absolutely dependent for diagnosis on cell morphology. The non-granular cells present are of three main types: (i) normal lymphocytes,

(ii) normal monocytes and (iii) abnormal mononuclear cells. Considerable doubt still exists as to the origin of these abnormal cells, and it has been held by some authorities that they are abnormal lymphocytes, and by others that they are abnormal monocytes. Supravital staining methods led McLean[11] to conclude that they were neither lymphocytes nor monocytes, but "lymphendotheliocytes". One of the most characteristic features of these abnormal cells is their variability, in size, in structure and in staining properties. They vary in size from that of a small lymphocyte to that of a monocyte. The nucleus, whose size bears no fixed ratio to the size of the cell, may be circular, reniform or indented in shape, and centrally or peripherally situated; it usually stains darkly but not evenly. The cytoplasm may be pale, but it is usually deeply basophilic, and may be vacuolated or contain azurophile granules. It is difficult to describe these cells accurately because of their variability; but in a blood film they form a characteristic picture which, having been once seen, is readily recognized again. The origin of these cells is largely a matter of academic interest, and it is not expedient to count all cells in their special types, but to group lymphocytes, monocytes and abnormal cells under the one heading of mononuclear cells.

### *The Paul and Bunnell Test.*

Serological examination is another useful procedure in infectious mononucleosis, for we have at our disposal the heterophile agglutination test first described by Paul and Bunnell in 1932.

A heterophile antibody has been defined as "one having the capacity to react with certain antigens which are quite different from, and phylogenetically unrelated, to the one instrumental in producing the antibody response".[10] Just such an antibody was found to be present in the serum of patients suffering from infectious mononucleosis, and its presence is demonstrated by its ability to produce agglutination of sheep's corpuscles. The discovery of this heterophile antibody in infectious mononucleosis was entirely fortuitous; but Paul and Bunnell, having stumbled on it when seeking a different objective, had the wit to see its significance and to carry out further investigations to establish its clinical utility.

The technical details of the test are outside the scope of this paper, but a few words may be said about the results obtained. Studies of many different clinical conditions demonstrated the presence of hererophile antibodies in infectious mononucleosis in dilutions up to 1:1,024.[10] Serum disease was found to be the only other condition in which they were found in dilutions greater than 1:16, and this condition sometimes gave a positive response to the test in a dilution of 1:64. It may therefore be concluded that when a patient's serum agglutinates sheep's corpuscles in a dilution greater than this figure, one is almost certainly dealing with a case of infectious mononucleosis.

Agglutination in dilutions up to 1:1,000 are the rule rather than the exception, and cases have been reported in which agglutination occurred in a dilution of 1:163,840.[10]

Positive results to agglutination tests were demonstrated in eight of our ten cases. Unfortunately Cases I and III were not serologically investigated; but there is little doubt that a positive reaction would have been obtained in Case I, had the test been carried out.

### *The Wassermann Test.*

False-positive reactions to the Wassermann test are sometimes encountered. When present they usually appear in the second week and are of short duration, lasting generally only a matter of days. An incidence of 18% has been recorded in one series of cases,[10] so that it is a possibility which should be borne in mind, for it might readily cause confusion.

### *Bacteriological Examination.*

Bacteriological investigation of the blood has been unproductive up to date, and the existence of the *Bacillus monocytogenes hominis* isolated by Nyfeldt has not been confirmed. Throat cultures have produced Vincent's organisms, streptococci and other flora, which are found in normal subjects, and which doubtless are present only by coincidence. It can be stated that so far bacteriological investigation has thrown little light on the subject.

## Epidemics.

Sporadic cases appear from time to time in every community, and doubtless they are even more common than is apparent, for it is not unlikely that many of the milder attacks are ignored by the patients, or if they do seek medical advice, the diagnosis is overlooked, and the patient makes a good recovery from what he thought was influenza or tonsillitis. Epidemics occur infrequently in most communities, but especially in colleges, homes or even hospitals, and there are several references in the literature to such outbreaks.

## Diagnosis.

The variability of symptoms and signs in infectious mononucleosis has already been stressed, and it is so protean in its manifestations that one or other of its features may suggest a multiplicity of different pathological states. The diagnosis may therefore present almost insuperable difficulties, if one is dependent on clinical methods alone. In the vast majority of cases the examination of a blood film, together with the use of the heterophile antibody test, will establish the diagnosis without more ado; but frequently it is not convenient to avail oneself of the assistance derived from the ancillary branches of medicine. These are the occasions when reliance must be placed on clinical observations alone, and many anxious moments may pass before finality in diagnosis is established.

Sir William Osler once remarked that more mistakes were made through not looking than through not knowing, and one feels that one may occasionally be saved the embarrassment of a diagnosis made by the hæmatologist if the possibility of infectious mononucleosis has been borne in mind. It is a comparatively uncommon disease, and this fact, together with its benign prognosis, has, I fear, relegated it in the minds of most practitioners to a position of diagnostic unimportance—a position, one might say, which is not commensurate with its ability to simulate serious illness.

For the purpose of discussing the differential diagnosis, it is convenient to adopt Tidy's classification into three clinical types—glandular, anginose and febrile. As has been remarked earlier, however, one encounters cases in which the characteristics of more than one type are present, and the factor of variability is so pronounced that it seems that classification into types is largely a matter of academic interest.

### *Glandular Enlargement.*

Cases in which glandular enlargement is the most conspicuous feature, may cause difficulty in differentiation from many conditions.

*Sepsis.*—Sepsis is one of the commonest mistakes, especially when the cervical group of glands only is affected. Acute follicular tonsillitis may be accompanied by cervical glandular enlargements, pyrexia and membrane or exudate in the throat; all of these are common manifestations of infectious mononucleosis. The patient in Case X of the present series, when he was first examined, had a single, enlarged and painful gland in the left groin, together with a slight pyrexia and malaise. The condition in this case was thought to be simple adenitis, secondary to a focus of infection between the toes, and it was only when a generalized glandular enlargement developed that the diagnosis was apparent. If possible, a blood count should always be made in such cases, for the mononucleosis of glandular fever can usually be distinguished from the neutrophile leucocytosis so typical of sepsis. The occasional case of mononucleosis in which an early granular leucocytosis occurs may, however, cause confusion.

*Secondary Syphilis.*—Secondary syphilis may be a possible source of error, for it can cause other glandular

enlargement than the well-recognized suboccipital involvement and the bubo. A further difficulty that may arise in this connexion is the occurrence of a false-positive reaction to the Wassermann test in infectious mononucleosis. Careful inquiry into the history and earliest symptoms will usually avert pitfalls in these cases, although the possibility that syphilis and infectious mononucleosis may coexist[1] must not be overlooked.

*Tuberculosis.*—Tuberculous adenitis should not cause confusion in diagnosis, as the two conditions are dissimilar in their mode of onset and clinical manifestations. A case has been reported, however,[2] in which disseminated tuberculosis caused a lymphocytosis as high as 97%. It is therefore apparent that this somewhat unusual possibility cannot be ignored.

*Lymphadenoma and Lymphosarcoma.*—Lymphadenoma and lymphosarcoma may also have to be considered. One finds enlarged glands and splenomegaly in both of these diseases. In addition to this, the febrile reaction of infectious mononucleosis may be misconstrued as an atypical Pel-Ebstein phenomenon, and so lead to an incorrect diagnosis of Hodgkin's disease. If careful inquiry is made, the insidious onset of symptoms in the last-mentioned condition should obviate mistakes.

*Leuchæmia.*—Acute leuchæmias of either lymphatic or monocytic type may constitute one of the most serious diagnostic problems. They may have the acute onset with pyrexia and glandular enlargement, which are so suggestive of infectious mononucleosis, and even examination of the blood film may deceive the unwary. Hæmorrhagic phenomena and anæmia are the rule in acute leuchæmia, whereas they are quite exceptional in infectious mononucleosis; but the most important point of differentation is that in the leuchæmias one usually encounters a uniform type of immature cell, whereas in infectious mononucleosis the predominant cell is of older type and more variable in its characteristics.

### *Anginose Signs.*

Cases associated with conspicuous oral and pharyngeal signs may closely simulate local infections in this area, and the true nature of the malady may be overlooked.

The difficulty of distinguishing simple acute tonsillitis has already been stressed, and needs no further comment.

Pharyngeal diphtheria is a commonly made mistake in diagnosis; it occurred in at least one of our cases. A pseudo-diphtheritic membrane is not unusual, and may mislead physicians of experience.

Some authors[3] have reported quite large numbers of patients admitted to hospital with the diagnosis of diphtheria, and subsequently proved bacteriologically not to be suffering from diphtheria. It is a matter of some moment to make an accurate diagnosis in such cases, for if the patients are given large doses of anti-diphtheritic serum they may subsequently develop serum sickness, and so confusion may be caused in the interpretation of the results of the heterophile antibody test.

Vincent's infection is a common accompaniment of infectious mononucleosis, and clinical signs of the former should always suggest the possibility of coexistence of the latter.

Agranulocytosis is another possible cause of error, though this is exceedingly uncommon, and is usually preceded by a history of some form of drug therapy.

### *Fever.*

The identification of those cases of infectious mononucleosis in which fever is the most conspicuous feature at times presents the greatest difficulty. Most of us have encountered pyrexias of obscure origin, which have defied our diagnostic efforts until such time as the course of the disease has made it apparent that the patient is in imminent danger or is about to recover. Such cases fall to the lot of every physician from time to time, and can constitute one of the greatest diagnostic problems in the whole field of medicine.

The majority of cases of obscure fever are of serious import, and it is therefore a matter of some moment to establish the diagnosis as early as possible.

As has already been remarked, infectious mononucleosis is an accomplished mimic and can simulate any one of these complaints.

One of the most important fevers to exclude is typhoid, and at times its identification may defy even our best efforts. When it is realized that infectious mononucleosis may cause headache, bradycardia with dicrotic pulse, splenomegaly, and "rose spots", some of the difficulties may be apparent; but when, in addition to all this, one knows that leucopenia with lymphocytosis may be present, and that even a false-positive reaction to the Widal[4] test may occur, it is quite apparent that diagnosis may have to await observation of the clinical course of the illness. In such cases the heterophile antibody test may provide the only evidence on which to arrive at the diagnosis.

Other types of fever must receive due consideration, and though it is quite impossible to mention all the causes of obscure pyrexia, attention should be paid to the likelihood of bacterial endocarditis, septicæmia and local suppuration, especially perinephric abscess.

All these conditions are associated with a neutrophile leucocytosis, which should suffice to differentiate them from infectious mononucleosis, though, as was remarked earlier, such a blood finding occasionally occurs in the earliest stages of infectious mononucleosis.

Malaria is another possible cause of intermittent pyrexia, and though it is somewhat uncommon in Sydney, the possibility should not be forgotten, for on purely clinical grounds the differentiation of malaria from infectious mononucleosis may present difficulties.

### *Jaundice, Mumps, the Infective Exanthemata.*

One cannot terminate such a discussion on diagnosis without reference to jaundice, mumps and the infective exanthemata.

Cases have been reported from time to time in which jaundice of obscure origin was found to be due to infectious mononucleosis. The jaundice is of the regurgitant type, and is thought to be due to enlargement of glands in the portal fissure.

This type of jaundice, when occurring in the young, is likely to be diagnosed as catarrhal jaundice, and unless some unusual features are present, its true cause may be overlooked. In any such case, if there is reason to doubt the diagnosis, a blood film should be examined and the serum investigated for the presence of heterophile antibodies.

Mumps has been said to be a possible cause of confusion in diagnosis; but as infectious mononucleosis does not affect the salivary glands, careful examination should preclude mistakes.

Rubella and scarlatina may on occasions be difficult to differentiate from infectious mononucleosis, for the skin manifestations in the last-mentioned may closely simulate infective exanthemata. One also finds glandular enlargement in these conditions together with inflammation of the throat.

Once again we may have to rely on the hæmatological findings to lead the way to diagnosis.

## Prognosis.

Little need be said about prognosis, as it is invariably good. Only one or two fatal cases have been reported, and it is not clear whether the patients really died from infectious mononucleosis, or from some coexisting disease.

Occasionally complications occur which may prolong convalescence; but the majority of patients can look forward to complete recovery within a few weeks.

## Treatment.

There is no specific remedy for infectious mononucleosis, and treatment is purely symptomatic. It may be desirable to exhibit a tonic in the convalescent period, or even to give a course of iron therapy. The great majority of patients, however, require no treatment other than rest in

bed, the administration of aperients and perhaps an aspirin, phenacetin and caffeine mixture to relieve headache in the early stages.

## Conclusion.

In conclusion, one feels tempted to quote Bernard Shaw, who once remarked that though he might have exhausted his audience, he had not exhausted his subject.

## Summary.

1. A brief historical review of the literature on infectious mononucleosis is given.
2. Its clinical manifestations and distribution are described.
3. The possible cause of the condition is discussed, and brief notes on its pathology are included.
4. The utility of the heterophile agglutination test together with hæmocytological investigation is stressed.
5. Differential diagnosis is discussed with special reference to some of the major difficulties which may be encountered.
6. A small series of ten cases is reported, and used to illustrate certain points in the discussion.

## Acknowledgements.

I wish to express my thanks to the medical superintendents of the Sydney Hospital, the Royal Prince Alfred Hospital and the Royal Alexandra Hospital for Children for their willing cooperation in this work and for allowing me access to their hospital records.

## Appendix.

CASE I.—J.L. was a male medical student, aged twenty-six years. The date of onset of his symptoms was November 25, 1934. He complained of febrile attacks, headache, malaise and sore throat. His pulse rate was increased and his temperature was raised; glands were palpable in both posterior triangles and axillæ; the spleen was enlarged and palpable. Differential leucocyte counts made on three occasions gave the results shown in Table I:

TABLE I.

| Cells. | November 26, 1934. | November 30, 1934. | December 8, 1934. |
|---|---|---|---|
| Total leucocytes per cubic millimetre | 12,400 | 17,760 | 7,960 |
| Neutrophile cells | 11% | 11% | 30% |
| Mononuclear cells | 89% | 88% | 67% |

No serological or cultural investigations were made. The patient was discharged from hospital on December 9, 1934.

CASE II.—F.S. was a schoolboy, aged eleven years. The date of onset of his symptoms was March 20, 1936. He complained of headache, sore throat and pain in the legs. He was febrile, and glands were palpable in the neck, axillæ and groins. The spleen was palpable and the throat clear. The differential leucocyte counts made on two occasions gave the results shown in Table II:

TABLE II.

| Cells. | March 24, 1936. | April 1, 1936. |
|---|---|---|
| Total leucocytes per cubic millimetre | 8,880 | 8,440 |
| Neutrophile cells | 26% | 37% |
| Mononuclear cells | 68% | 59% |

No Klebs-Löffler bacilli were grown on attempted culture from the throat. Neither the Wassermann nor the Kahn test produced a reaction. The heterophile agglutination test produced a reaction with a dilution of 1:128. The patient was discharged from hospital on April 2.

CASE III.—N.L. was a nursing trainee, aged twenty years. The date of onset of her symptoms was July 17, 1937. The history and the results of the physical examination were not available. The differential leucocyte counts made on two occasions gave the results shown in Table III:

TABLE III.

| Cells. | July 17, 1937. | July 23, 1937. |
|---|---|---|
| Total leucocytes per cubic millimetre | 19,960 | 9,320 |
| Neutrophile cells | 84% | 66% |
| Mononuclear cells | 12% | 33% |

No Klebs-Löffler bacilli were grown on attempted culture of material from the throat. The patient was discharged from hospital on July 31.

This case was diagnosed as one of glandular fever, but there is insufficient evidence in the notes to exclude other possibilities.

CASE IV.—R.P. was a male patient, aged twenty-nine years. The date of onset of his symptoms was October 30, 1937. He complained of fever, headache, and swelling in the left groin. Examination disclosed palpable glands in the neck, axillæ and groins; they were not tender. Splenomegaly and jaundice were present. The throat was inflamed and swollen, and a "dirty grey film" was found on the tonsils. The differential leucocyte counts made on three occasions gave the results shown in Table IV:

TABLE IV.

| Cells. | October 30, 1937. | November 4, 1937. | November 10, 1937. |
|---|---|---|---|
| Total leucocytes per cubic millimetre | 13,600 | 11,200 | 8,400 |
| Neutrophile cells | 13% | 15% | 22% |
| Mononuclear cells | 86% | 84% | 77% |

Neither the Wassermann nor the Kahn test produced a reaction, and no organisms were grown on attempted culture from the throat. The Van den Bergh test produced an immediate direct positive reaction, and the heterophile agglutination test produced a positive reaction. The patient was discharged from hospital on November 10.

CASE V.—F.H. was a schoolgirl, aged fifteen years. The date of onset of her symptoms was November 29, 1937. She complained of fever, headache, epigastric pain, epistaxis and a swollen neck. Examination disclosed palpable glands in the neck, axillæ and groins. The spleen was enlarged and tender. The throat was not inflamed, and faint icterus was present. The differential leucocyte counts made on three occasions gave the results shown in Table V:

TABLE V.

| Cells. | November 29, 1937. | December 5, 1937. | December 18, 1937. |
|---|---|---|---|
| Total leucocytes per cubic millimetre | 12,840 | 8,320 | 8,360 |
| Neutrophile cells | 18% | 24% | 43% |
| Mononuclear cells | 81% | 75% | 54% |

Neither the Wassermann nor the Kahn test produced a reaction. The Van den Bergh test produced an indirect positive reaction and the heterophile agglutination test produced a positive reaction. The patient was discharged from hospital on December 23.

CASE VI.—N.L. was a nursing trainee, aged twenty-two years. The date of onset of her symptoms was May 22, 1940. She complained of sore throat, malaise and epistaxis. Examination disclosed a membrane on the tonsils and bleeding points in the nose. The throat was swollen and painful. Glands were palpable in the neck only. The spleen was not palpable. The differential leucocyte counts made on three occasions gave the results shown in Table VI:

TABLE VI.

| Cells. | May 10, 1940. | May 28, 1940. | June 4, 1940. |
|---|---|---|---|
| Total leucocytes per cubic millimetre | 9,280 | 8,750 | 7,750 |
| Neutrophile cells | 77% | 39% | 29% |
| Mononuclear cells | 22% | 58% | 61% |

Culture of material from the throat produced a growth of *Streptococcus hæmolyticus*, *Streptococcus viridans*, *Staphylococcus aureus* and Vincent's spirilla. The heterophile agglutination test produced a positive reaction. The patient was discharged from hospital on June 4.

CASE VII.—L.C. was a male student, aged twenty-four years. The date of onset of his symptoms was August 2, 1940. He complained of pyrexia, night sweats, headache, sore throat and dysphagia. Examination disclosed that the throat was swollen and œdematous, and a membrane was present on the left tonsil. The cervical glands were swollen, and the spleen was palpable. The differential leucocyte counts made on two occasions gave the results shown in Table VII:

TABLE VII.

| Cells. | August 2, 1940. | August 9, 1940. |
|---|---|---|
| Total leucocytes per cubic millimetre .. .. | 10,000 | 5,040 |
| Neutrophile cells .. | 38% | 42% |
| Mononuclear cells .. | 61% | 54% |

The heterophile agglutination test produced a weakly positive reaction. The patient was discharged from hospital on August 9.

CASE VIII.—E.P. was a female patient, aged thirty-two years. The date of onset of her symptoms was March 4, 1941. She complained of headache, sore throat, an inflamed nose and swollen, painful glands. Examination disclosed that the throat was swollen, and that there was an exudate on the tonsils. Glands were palpable in the neck, axillæ and groins. The spleen was not palpable. The differential leucocyte counts made on two occasions gave the results shown in Table VIII.

TABLE VIII.

| Cells. | March 4, 1941. | March 6, 1941. |
|---|---|---|
| Total leucocytes per cubic millimetre .. .. | 23,040 | 10,650 |
| Neutrophile cells .. | 32% | 40% |
| Mononuclear cells .. | 66% | 57% |

The blood was found to be sterile. Culture of material from the throat yielded a growth of *Streptococcus hæmolyticus* and Vincent's spirillum. Neither the Wassermann nor the Kahn test produced a reaction. The heterophile agglutination test produced a strongly positive reaction. The patient was discharged from hospital on March 14.

CASE IX.—K.S. was a schoolgirl, aged nine years. The date of onset of her symptoms was March 24, 1942. She complained of malaise, headache and fever. Remittent pyrexia was present. The right tonsillar gland was slightly enlarged. Transitory conjunctivitis and œdema of the upper eyelids was present. The differential leucocyte counts made on five occasions gave the results shown in Table IX:

TABLE IX.

| Cells. | March 2, 1942. | March 11, 1942. | March 18, 1942. | April 18, 1942. | July 2, 1942. |
|---|---|---|---|---|---|
| Neutrophile cells | 12% | 22% | 8% | 56% | 36% |
| Mononuclear cells | 87% | 77% | 90% | 41% | 61%[1] |

[1] Mostly small lymphocytes.

The Wassermann test failed to produce a reaction; the heterophile agglutination test produced a strongly positive reaction. The patient was afebrile and allowed out of bed on April 24.

CASE X.—W.B. was a male medical student, aged twenty-two years. The date of onset of his symptoms was April 23, 1942. He complained of a swollen, painful gland in the left groin, and of headache, malaise, slight pyrexia, and later of a sore throat. On examination generalized glandular enlargement was present. Neither the liver nor the spleen was palpable. On April 24 the erythrocytes numbered 6,350,000 per cubic millimetre and the hæmoglobin value was 19·2 grammes *per centum*. The differential leucocyte counts made on six occasions gave the results shown in Table X:

TABLE X.

| Cells. | April 23, 1942. | April 28, 1942. | May 12, 1942. | May 13, 1942. | May 17, 1942. | July 11, 1942. |
|---|---|---|---|---|---|---|
| Total leucocytes per cubic millimetre.. | 5,350 | 6,550 | 6,240 | 9,050 | 6,920 | 5,680 |
| Neutrophile cells .. | 30% | 22% | 26% | 16% | 28% | 38% |
| Mononuclear cells | 54% | 59% | 69% | 69% | 70% | 55% |

On April 27 the heterophile agglutination test produced no reaction, but on May 7 the test produced a strongly positive reaction with dilution up to 1:900. The patient was discharged from hospital on May 18.

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# Reviews.

## THE NURSING OF NERVOUS PATIENTS.

SOMEBODY has said that a good nurse is a gift from God; and Professor John Bostock has written a book which should help the average nurse to attain not only an added proficiency in her work, but some of those indefinable qualities which transform her into a ministering angel whose services can never be repaid in coin of the realm. "The Nursing of Nervous Patients"[1] is, apart from anything else, an elementary introduction to psychiatry, in the writing of which the author has scored the double distinction of writing simply and at the same time interestingly about an intricate subject. This is a rare accomplishment, for the subject in the manner in which it is usually handled tends to become not only frightening but dull, and medical students and nurses should be excused their lack of interest and want of understanding when in so many books their introduction to the subject is through an arid Sahara of academic psychology. Dr. Bostock waives all this sterile theorizing and stilted definition and in the homeliest language introduces the reader to his nervous patients, and while talking about their foibles and fears manages to illustrate the necessary psychological concepts.

Both medicine and psychiatry have suffered for centuries because of the unfortunate and unnatural divorce of mind and body. This led to serious shortcomings on the part of nurses who have been called upon to handle nervous patients. The cleavage is not so great nowadays as it was formerly and it is becoming less each year. The reading of Professor Bostock's book should help to bring these branches of healing even closer together, for he rightly stresses the complete interaction of body and mind.

> When a nurse thinks of a "case", it must not be in terms of an organ, a broken bone or diseased heart, a septic tonsil or a child-birth, but as a personality in trouble, the whole man, woman or child, who is in need of care and attention.

Professor Bostock, as a psychiatrist, knows that a good nurse is not merely one who has acquired skill and dexterity in the mechanical and technical side of her profession. He believes that a broad general knowledge of life, large tolerance and deep sympathy are essential to the difficult art of nursing nervous patients. He believes that her activities must be guided by understanding. He believes further that the successful nurse must possess religious insight and a steadfastness of character if she is to help patients who are mentally distressed. Her personality must be many-sided. Optimism must be as plentiful as hot water. Courage and forbearance are imperative. And the ability to see joy in small things helps to bring happy smiles which in the sick room "act as a psychological lubricator to the whole system".

The title of this book need deceive no one. It is written for general nurses who sooner or later will be called upon to treat nervous patients or those in whom nervous upset is a factor in the illness. It is not exclusively psychiatric, although it covers that field. There is a chapter for the masseuse; and the author is justified in his belief that the friends and relatives of nervous patients will benefit by its perusal. Its language is simple and direct. Interest is sustained not only by the writer's wide knowledge and personal mode of expression, but also by many a homely reference and pithy description. He has the gift of being able to drive his points home by the use of everyday similes and apt comparisons. He speaks colloquially. He takes the reader into his confidence. He explains and illustrates by reference to the things we do and think in daily life. He dresses his ideas in terms of the familiar. His appeal is always to the court of common sense. The highbrow reader may be irritated by an over-simplicity of explanation and a certain jauntiness in the manner of presentation. The academic critic may quibble at the looseness of some of the definitions, or the fault-finder point out that Narcissus fell in love with his reflection in the fountain and not with a statue. But the average nurse whose first impulse is to eschew anything savouring of the psychiatric, is likely to bless the author of this little book for the way in which he clarifies the many difficulties in an unfamiliar subject. She is likely to find inspiration in this clear and vivid description of commonplace yet baffling types of illness. She certainly will not forget the author who first opened her eyes to the network of nervous complexes which lies behind all sickness.

The author modestly claims that what he has written is a "practical reference book". It is more. It is part of a crusade, in which it is hoped all doctors and nurses will join, against ignorance of the part which the mind plays in illness. It is a simple exposition of the tenets of psychiatry and at the same time a plea for the broader application of the principles of mental hygiene; and as such should find a niche in the armoury of all who essay the healing art.

[1] "The Nursing of Nervous Patients", by John Bostock, M.B., B.S. (London), M.R.C.S. (England), L.R.C.P. (London), D.P.M., F.R.A.C.P.; 1942. Brisbane: University of Queensland. Crown 8vo, pp. 176.

## SAINT VINCENT'S HOSPITAL (SYDNEY) PHARMACOPŒIA.

THE first edition of Saint Vincent's Hospital Pharmacopœia (Sydney)[1] presents the usual collection of formulæ found in such a work, but differs from most others in that, for teaching purposes, some elementary therapeutic notes together with historic jottings are appended to individual formulæ.

The expectation that a formulary making its first appearance in 1942 would be an epitome of current thought is rapidly dissipated as one turns its pages.

The unsystematic nomenclature employed in titles for the prescriptions deviates considerably from modern ideas of clarity. Such names as *Liq. Burowi*, *Ung. Brooke* and *Ung. Besnieri*, to mention but a few of this type, pay more homage to tradition than to modern practice.

Titles like *Mist. Analgesica Antipyretica*, *Inhal. Catarrhalis* and *Ung. Tineæ* look like thought-saving boluses of information, but have the effect of restricting thoughtful therapeutic application.

The term *"guttæ"*, applied to drops for instillation into ears and nose as well as the eyes, is a nightmare to the dispenser, and might reasonably be reserved for eyedrops—the more specific terms *"auristillæ"* and *"naristillæ"* being maintained for drops for the ear and nose respectively. Similarly, the ponderous title *"Pulvis ad usum externum"* applied to the conspersus or dusting powder is surely a concession to the exuberant scholarship of our therapeutic forebears.

Some of the formulæ will not bear critical inspection; *Glycerin Amyli Co.*, containing starch and tragacanth in a glycerin base, with no water to make either available, is quite unworkable. *Guttæ Physostigminæ et Cocainæ (Oleosæ)*, carrying both cocaine alkaloid and cocaine hydrochloride in a castor oil base, is objectionable on many grounds, and looks a little like "having a shilling both ways". Such oily eyedrops, bearing in solution water insoluble alkaloids, do not cater for an efficient transference of the alkaloid to the tears, and their retention is a triumph of elegant pharmacy over practical pharmacology.

There is a certain naïveté in the statement that *Pasta Mag. Sulph.*—made with an unstandardized and variably exsiccated magnesium sulphate—will have a predictable consistency. The only method of ensuring a standard product is that outlined in the Emergency Formulary of Australia.

The use of the morphine suppository for local analgesia in painful conditions of the rectum was rife in that dark period that preceded the dawn of pharmacology, but in these days it seems a roundabout way to secure local analgesia with a centrally acting drug.

In *Mist. Quininæ Ergotæ et Strychninæ*, the liquid extract of ergot (B.P. 1914) is specified in the formula. A footnote condemns it and advises the prescriber to specify the liquid extract of the B.P. 1932, notwithstanding the facts that the two extracts are of very different constitution and that the latter rapidly deteriorates in aqueous media.

Lack of definition in a prescription is one of the major misdemeanours of prescribing, yet in *Inhal. Coghilli* the basic ingredient is *creosoti vel thymoli*. If this inhalation is prescribed by its title, as advocated in the preface, the onus of a decision is quite unreasonably thrown on the dispenser.

An obvious incompatibility is the professed recognition of the present need for economy in the use of certain specific drugs with the presentation of quinine for non-malarial use in capsule, enema, eyedrops and three mixtures.

A section on toxicology falls well below the modern standard and in some sections is actually misleading. In the summary of general principles no mention is made of the importance of physical and chemical antidotes, which, in their early and intelligent application, may conceivably eliminate the subsequent need for a physiological antidote.

The production of such a work with its further multiplication of local prescribing standards is really an argument in favour of the production of a national hospital pharmacopœia.

[1] "St. Vincent's Hospital Pharmacopœia", First Edition; 1942. Sydney: Dymock's Book Arcade Limited. Demy 16mo, pp. 95.

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## "THE CRISIS OF OUR AGE."

If half a dozen people of average intelligence were taken haphazard from the community and asked to explain the nature of the present world crisis, probably six entirely different sets of views would be forthcoming. One would declare that the issue was that of one form of government against another, totalitarianism as opposed to democracy; another would hold that the forces of communism or of socialism were arrayed against fascism; another perhaps would discuss the crisis in terms of the liberty of the subject; nationalism and internationalism would probably be mentioned; the aims of one nation might be contrasted with those of another, malignant designs being attributed to one and those of the other being regarded as natural, pure, altruistic and entirely commendable; of course certain "bad men" would be mentioned, most of them being in the ranks of the enemy and some of them possibly on our own side. Though none of those questioned would give a complete explanation of the present turmoil, all their views would comprise an element, and some much more than an element, of truth. To look beyond the more or less obvious issues of the conflict for some basal, some ultimate, conditions which have brought it about, implies neither lessening of will nor slackening of effort to determine it. Rather does such a search betoken a thoroughness readily understood by medical men and women. It is as though a community was attacked by a disease that had high morbidity and mortality rates. The medical practitioners of the place would study the clinical manifestations; they would try to discover and isolate the causative microorganism; they would do their best to devise specific treatment to overcome the infection; they would arrange the environment of sufferers so that recovery would be speedy. They would do all this and to many it might appear that they had done a good job of work; everyone will, however, agree that their study would not be complete until they had carried out immunological and epidemiological investigations in the hope that future outbreaks might be prevented.

The analogy between world war and an infective disease is not complete, for whereas only those trained in medicine could come to a decision about the epidemiology and immunology of a disease and the rest of the community would have to accept the findings and put them to the test, it is the duty of every man and woman in the community to make an effort to discover why the world is plunged into the abyssmal horrors of war. Most people agree that this war will be followed by change in the present way of living. Some hail the change as one that will bring about an epoch of which their socialistic souls have dreamed; others can see before humanity nothing but gloom and decadence. No doubt there are some who could give a reason for their opinions, but it is safe to assert that the greater number would find it impossible to do so. When, therefore, we find a book in which the causes of this war, its nature and its possible sequelæ are investigated by one who has given years of study to the subject, that book should be made widely known and just as widely circulated.[1] The author of this splendid study is Dr. Pitirim A. Sorokin, sometime President of the International Institute of Sociology and now Chairman of the Department of Sociology of Harvard University. We can imagine no more important book for the present time and should like to know that people everywhere were reading it. Everyone may not agree with the conclusions drawn by the author from his deep historical and philosophical probing; they may not agree with his suggested remedy. That will not matter very much. They cannot disagree without putting up some opposing views and some counter suggestions; to do this they will need to give much thought to the problem and constructive thought is needed today more than ever. The main point about Sorokin is that he is not a pessimist; his optimism carries him to the highest plane and we propose to trace his main argument.

Sorokin writes that the crisis is here in all its stark and unquestionable reality. "We are in the midst of an enormous conflagration burning everything into ashes. In a few weeks millions of human lives are uprooted; in a few hours century-old cities are demolished; in a few days kingdoms are erased. Red human blood flows in broad streams from one end of the earth to the other. Ever-expanding misery spreads its gloomy shadow over larger and larger areas. The fortunes, happiness, and comfort of untold millions have disappeared. Peace, security, and safety have vanished. Prosperity and well-being have become in many countries but a memory; freedom, a mere myth. Western culture is covered by a blackout. A great tornado sweeps over the whole of mankind." It is the nature, causes and consequences of this crisis which Sorokin tries to lay bare. He points out that two opposing views seem to be prevalent. According to one view the present is an ordinary crisis, similar to many through which Western society has passed several times in every century—most experts view it as a sharp form of either economic or political crisis. The other diagnosis is more pessimistic. It views the crisis as the death agony of Western society and culture—no remedy can avert this

[1] "The Crisis of Our Age: The Social and Cultural Outlook", by Pitirim A. Sorokin; 1941. Sydney: Angus and Robertson Limited. Demy 8vo, pp. 280, with diagrams and charts. Price: 9s. 6d. net.

destiny, no cure can prevent this irretrievable collapse. In Sorokin's opinion both these diagnoses are grossly inaccurate. The present crisis is not ordinary but extraordinary. "It is not merely an economic or political maladjustment, but involves simultaneously almost the whole of Western culture and society, in all their main sectors. It is a crisis in their art and science, philosophy and religion, law and morals, manner and mores, in the forms of social, political, and economic organization, including the nature of the family and marriage—in brief, it is a crisis involving almost the whole way of life, thought, and conduct of Western society." Any great culture is not a mere dumping place of a multitude of diverse cultural phenomena, existing side by side and unrelated to one another. Instead it represents a unity or individuality whose parts are permeated by the same fundamental principle and articulate the same basic value. This value serves as the major premise and foundation of the culture. For this reason the important parts of such an integrated culture are also interdependent causally—if one important part changes, the other important parts are bound to be similarly transformed. With this as his starting point Sorokin proceeds to describe three types of culture which have succeeded one another at varying intervals in the world's history; these are the ideational, the idealistic and the sensate. In the ideational culture, typified in Western mediæval culture, the integration was not a conglomeration of various cultural objects, phenomena and values, but a unified system—"a whole whose parts articulated the same supreme principle of true reality and value: an infinite, super-sensory, and super-rational God, omnipresent, omnipotent, omniscient, absolutely just, good, and beautiful, creator of the world and of man". This was the Christian culture, but a basically similar major premise respecting the super-rational and super-sensory reality of God, though differently perceived in its properties, underlay the integrated culture of Brahmanic India, the Buddhist and Taoist cultures, Greek culture from the eighth to the end of the sixth century B.C., and some other cultures. The decline of mediæval culture consisted in the disintegration of the ideational system of culture. It began with the emergence of a new and profoundly different major principle, that "the true reality and value is sensory". "Only what we see, hear, smell, touch, and otherwise perceive through our sense organs is real and has value. Beyond such a sensory reality, either there is nothing, or, if there is something, we cannot sense it; therefore it is equivalent to the non-real and the non-existent. As such it may be neglected." The blending of this new principle with the declining principle of ideational culture produced an essentially new form of culture whose major premise was that the true reality is partly super-sensory and partly sensory—that it embraces the super-sensory and super-rational aspect, *plus* the rational aspect, all blended into one unity, that of the infinite manifold God. This culture Sorokin calls the idealistic culture. He points out that the process of blending did not stop. The ideational culture continued to decline, whereas the principle that true reality and value are sensory continued to gather momentum. In this way the modern form of culture emerged—the sensory, empirical, secular, utilitarian and "this-worldly" culture. This Sorokin calls sensate culture.

Sorokin shows that all three types of culture have been exemplified in the history of the world; this appears again and again in the successive stages of his discussion. His method leads to a certain amount of repetition which merely serves to drive home the lesson he wishes to teach. He discusses the crisis as it affects the fine arts, and the system of truth in science, philosophy and religion; he deals with it in relation to ethics and law, in relation to contractual organization in the family and in the governmental and organic spheres and in relation to criminality, war, revolution, suicide, mental disease and impoverishment; he also discusses what he calls tragic dualism, chaotic syncretism, quantitative colossalism and diminishing creativeness of the present culture. He shows that a society is orderly when its system of culture and social relationships is well integrated and crystallized; it becomes disorderly when this system disintegrates and enters a period of transition.

"What the society and culture are, such will their fine arts be." The three types of culture may be exemplified in the three types of art. Ideational art is a mere visible or sensory sign of the invisible or super-sensory world of values. Its objective is not to amuse, entertain or give pleasure, but to bring the believer into a closer union with God; it is a part of religion. Its significance is not its external appearance but in the inner values it symbolizes. Sensate art on the other hand lives and moves entirely in the empirical world of the senses. Its aim is to afford a refined sensual enjoyment; it is divorced from religion, morals and other values, and styles itself "art for art's sake". Idealistic art is an intermediary between the ideational and sensate forms of art. Its world is partly super-sensory and partly sensory, but only in the sublimest and noblest aspects of sensory reality. Its style is partly symbolic and allegorical, partly realistic and naturalistic. Its emotional tone is serene, calm and imperturbable. The important point to be remembered is that the preeminence of each form of the fine arts is not a question of the presence or absence of artistic skil, but of the nature of the dominant super-system of culture. Sorokin holds, and it is hard to gainsay him, that at its over-ripe stage sensate art has for its "heroes" prostitutes, criminals, street urchins, the insane, hypocrites, rogues and other sub-social types; it is certainly "marked by voluptuous nudity and concupiscence". If we look at present-day plays, pictures, revue "shows", "best sellers" and so on, we shall be forced to confess that "sensate art" has come to the end of its period. As Sorakin puts it—sensate art seems to have performed its mission. "It has exhausted its creative forces and shows signs of fatigue, sterility, perversion and decadence"; and nothing can stop this decadence.

What is true of the fine arts is true of the system of truth in science, philosophy and religion. Pilate's question "What is truth?" is perennial and still awaits an adequate answer for all cultures and all minds. Such an answer, Sorokin thinks, presupposes an omniscient, superhuman mind. For the limited human mind only a relative answer is possible and this will be found to comprise solutions which fall into three classes, corresponding to the three main super-systems of culture. These are the ideational, idealistic and sensate systems of truth and knowledge. Ideational truth is the truth of faith, yielding knowledge about the true reality values. Sensate truth is the truth

of the senses, obtained through man's organs of sense perception. Idealistic truth is a synthesis of both, made by our reason. Human reason "combines into one organic whole the truth of the senses, the truth of faith, and the truth of reason". These are the essentials of the idealistic system of truth and knowledge. Sorokin points out that to many persons the possibility of the occurrence of a crisis in the system of truth seems improbable. They think that the truth of the senses incorporated in science is the only system of genuine truth, that this truth is destined to progress, because at the present stage of human science and culture no retrogressive movement from science to ignorance, from truth to error, from tested sensory knowledge to untested magical and speculative beliefs is possible. Though the reasoning sounds thoroughly convincing, Sorokin states that it is fallacious, and for two reasons. The first fallacy is that there can be only one valid system of truth, that of the senses; the second fallacy is the belief that in the course of time there has been a steady linear trend in the direction of sensory truth at the expense of faith and of dialectical and speculative reasoning. History shows that there have been a series of oscillations from one dominant system of truth to another. The reason for such oscillations is readily to be understood because "no single system comprises the whole of truth; nor is it, on the other hand, entirely false". As a matter of fact "each of these systems of truth tends to produce misapprehension when it is isolated from, and unverified by, the other great sources of cognition and truth". Since THE MEDICAL JOURNAL OF AUSTRALIA is published for persons who have had a scientific training, it would be fitting if a full statement of Sorokin's argument about the crisis of the contemporary sensate system of truth could be given in this place. This is obviously impossible, for such a statement would occupy far more space than can be given to our whole account of the book. We hope, by showing that this book is very much worth while, to induce readers to study it for themselves. Sorokin points out that the crisis in regard to truth is theoretical and practical. Its theoretical phase is revealed in a progressive obliteration of the boundary line between sensory truth and falsehood, reality and fiction, validity and utilitarian convention. Again, by an excessive development of its relativism the truth of the senses has contributed to the effacement of the difference between sensory knowledge and ignorance; and similar results are produced by the "temporalistic character" of the truth of the senses. Equally detrimental to sensory truth is its materialistic bent, which undermines the system of truth theoretically and practically. "Theoretically it undermines it through the crudity, invalidity and baselessness of any consistent materialism from the standpoint of even sensory truth itself. Practically it produces the same effect by degrading man and his culture and values to the level of matter and its complexes." Sensory science has still further undermined its own values through a progressively thin and narrow empiricism divorced from other social values—religion, goodness, beauty and the like. Finally, because of its enormous and complicated assortment of facts—poorly integrated, often irrelevant, and despite their alleged precision often contradictory—empirical science has distinctly impaired our understanding of reality. Sorokin thus declares that the crisis in the theoretical system of sensory truth is evident, but that its practical failure is still more obvious. Its practical failure is demonstrated by our increasing inability to control mankind and the course of the socio-cultural process. Often the ways and means recommended in the name of science for an eradication of poverty, war, tyranny, exploitation and other social evils have actually contributed to their increase. "No better evidence of the nemesis of one-sided sensory truth is needed."

Turning to ethics and law and to contractual relations, Sorokin tells the same kind of story. In regard to ethics and law we are a "society of endless contesting parties without a moral judge to decide the contests". "The result is moral chaos and anarchy." In regard to contractual relations "we are simply reaping what was already implicit in sensate culture at the outset"—the crisis of contractual society has gone so far that it is idle to expect that the decay of contractualism can be arrested. Genuine contractual relations can and will be restored, but they can be restored only "in the fresh air of an entirely different cultural system, either ideational or idealistic".

From the foregoing it must not be concluded that Sorokin regards the period of sensate culture as either entirely bad or useless. On the contrary he is at some pains to point out that its achievements have undeniable value and that in many ways they are without question extraordinary, ranking among the most brilliant in the field of social relationships, in building a free society of free men. In another place he writes that the sensate phase has written the most magnificent page in the whole history of mankind and culture. This does not mean that the sensate phase has not become exhausted and needs a rest. "It should hand on the torch of creativeness to other forms of culture." It is thus clear that the waning of sensate culture is inevitable; it is part of an evolution. The present war is the outcome of the decay of the sensate culture of today. Thus it is also obvious, as Sorokin explains, that the tragedy is not created by the fancy and fiat of wicked persons, be they Mussolinis or Hitlers, by master minds of criminality or by geniuses of perversion. "All such leaders are the product and instrumentalities of the immanent defects of sensate culture." "Only in such a social context could they arise." The sensate cultural period is thus destined to give way to a cultural period of another kind. In this regard Sorokin hazards the guess that so long as the transition period lasts, and until the advent of a new ideational or idealistic society and culture, war will continue to maintain its dominant role in human relationships. "Even if an armistice were to be signed tomorrow, it would represent merely an interlude, to be followed by an even more terrible and catastrophic Armageddon."

But at this stage the reader will ask: "What of the future?" This question can be answered from Sorokin's point of view by reference to his views on the "meaning" of the disintegration of sensate culture and then by enumeration of his prescribed measures for the future. The disintegration of sensate society does not mean a physical disappearance of the Western population; it means a progressively increasing defection of this population from sensate culture with its values and a shift of its allegiance to other forms of culture. It does not mean the total destruction of all vehicles and instrumentalities of our contemporary culture; they will survive, but will become more and more the instrumentalities of ideational

or idealistic systems of meaning and systems of values. The total of our culture will not deteriorate or disintegrate. Sorokin holds that the whole of Western culture has never been integrated and therefore cannot disintegrate. It is what he calls the "super-sensate" portion which will disappear. This disappearance will determine a progressive deterioration of sensate systems of meanings and values. Members of society will be split into groups of two distinct types until the transition is over and a new culture is established. All this, of course, is contingent on the deliberate choice by society of a new culture and a forsaking of the old form. It will be urged that unless the forces of the enemy are overcome in the present world war there is no hope of the emergence of a new form of culture for many generations to come, since the totalitarian foe has shown a ruthlessness and a barbarity which could find no place in any ideational or idealistic culture. This will be granted. But even so, a choice still has to be made by ourselves. A new culture will not come to us unless we seek it, and we not only have to seek it, but we have to try to make ourselves worthy of it. Let us listen to Sorokin once more. There must be a concerted preparation for the inevitable mental and moral and socio-cultural revolution of Western society. The first step consists in as wide, as deep, and as prompt a realization as possible of the extraordinary character of the crisis. The next step is the recognition that the sensate is not the only form of culture and is not free from many defects and inadequacies, and also that a change is needed. Further, this change must not be opposed, but welcomed. When this is done premises and values must be reexamined, pseudo-values must be rejected and real values reenthroned. The present antagonism between science, religion, philosophy, ethics and art is unnecessary and disastrous. "In the light of an adequate theory of true reality and value, they all are one and all serve one purpose: the unfolding of the absolute in the relative empirical world, to the greater nobility of Man and to the greater glory of God. As such they should and can co-operate in the fulfilment of this greatest task." Sorokin adds the practical statement that such a transformation of Western culture must naturally be followed by a corresponding transformation of social relationships and forms of social organizations. "Just because man is sacred, no state or its rulers has any right to inflict ruin and misery upon millions for the sake of the aggrandizement of the territory, possession, and power of the state or for that of their own glory. . . . . Just because man is sacred, no rich class has a right to enjoy the prodigal life and to hold huge fortunes in its possession while millions of decent, honest, industrious men are jobless, breadless, and devoid of the elementary necessities of life. The interaction and interlocking of the lives and happiness and dignity of all classes of mankind is so close and interdependent at the present time that no such isolation is justifiable or possible any more." There must be, Sorokin insists, no mechanical switching over to a particular political creed such as socialism or communism. There must first be a complete change of mentality and attitude in the light of the doctrine of the Sermon on the Mount. "Without this change, no mechanical, politico-economic reconstruction can give the desired results." This is an expansion of a statement made recently in these pages about "the full and complete love, the love of humanity, the love of a man for his fellow just because he is a man" and the contention that "according to the number of men we have among us with this equipment so shall we be likely to lay the foundation of a just and stable future". Whatever one may think of statements of this kind, there is no escaping the fact that the present world crisis strikes at the foundations and roots of all our beliefs. Sorokin's book is a valiant attempt to explain the position and to help society in its reconstruction. All intelligent men should be grateful to him.

# Current Comment.

## DUPUYTREN'S CONTRACTURE.

In the past thirty years our knowledge of the ætiology of many diseases has been clarified; but not so of that disease of the palmar fascia referred to as Dupuytren's contracture. Many familial cases have been reported, and these are probably more in number than can be accounted for by the laws of chance. Though there is no definite proof that trauma is a prime factor in the causation of this disease, it is still possible that it may be a contributing factor in certain cases. The question of the relationship of trauma to Dupuytren's contracture has been discussed by A. Bruce Gill[1] who concludes that trauma is not a prime factor for the following reasons: (i) The onset usually occurs after middle life, even in individuals who have been doing manual labour from their youth onwards. (ii) It is by no means confined to manual workers and it is comparatively uncommon in them. (iii) It is more often bilateral than unilateral. In the use of tools and implements more pressure and strain are usually placed on the palm of one hand than on the other. (iv) The ulnar portion of the palmar fascia is most commonly affected, while it is at least doubtful whether this portion of the palm is more subjected to injury than the remaining portion. (v) Trauma to the hand, both acute and chronic, is common while Dupuytren's contracture is rare. Gill drew attention to the resemblance which Dupuytren's contracture bears to chronic arthritis, although the two diseases are not often found together; and it may well be that some change occurs in the metabolic or biochemical processes taking place in the palmar fascia which gives rise to a reaction with the consequent production of scar tissue. The resemblance of this disease to chronic arthritis is close. The incidence and the activity of both diseases increase with the degenerative processes that accompany advancing age, and in both the reaction is chronic and insidious, although there are often alternating periods of exacerbation and remission. The association in many cases of syringomyelia with Dupuytren's contracture has also been reported, but with no satisfactory explanation for this association. It has been assumed that the vasomotor disturbances in the limb are responsible for the initiation of the contracture; but this is, of course, somewhat difficult of proof. The existence of such an association of Dupuytren's contracture and syringomyelia suggests that vasomotor disturbances should be looked for in the so-called idiopathic cases of the former disease. As yet, little success has attended this line of inquiry.

Histological studies of the palmar fascia from cases of Dupuytren's contracture reveal that the pathology is that of a hyperplasia of the connective tissue rather than an inflammatory reaction, but this gives little indication as to its ætiology. The subject of the histological changes in Dupuytren's contracture has been studied recently by T. Horwitz[2] who found that the hyperplasia of the connective tissue was not limited to the palmar aponeurosis, but extended to the skin and subcutaneous tissues and

[1] *Annals of Surgery*, Volume CVII, 1938, page 122.
[2] *Archives of Surgery*, Volume XLIV, April, 1942, page 687.

even involved the vessels and tendon sheaths. The most noticeable fact derived from his sections was the lack of correlation between the histological and the clinical features, such as the age of the patient, the duration of the pathological process as observed by the patient, and the severity and extent of the deformity. Often wide variations in the histological characteristics were evident in the same specimen. Further, no definite relationship could be established between the histological picture and the likelihood of recurrence, for in the cases in which there were recurrences the pathological features were not different from those cases in which no recurrence was demonstrable clinically.

Interest in the ætiology and pathology of Dupuytren's contracture is based primarily on the frequently unsatisfactory results of treatment. Focal sepsis should be eliminated and any constitutional disease corrected; but for the local treatment of the disease excision of the palmar fascia still offers the only means of certain and complete cure, as it did thirty years ago. The chief advances in treatment during this time appear to be the forsaking of such operations as fasciotomy for the more radical excisions of the palmar fascia and the realization that the minor degrees of this disease need not impair the function of the hand and are not always progressive; thus operation is not invariably indicated.

There are still many unexplained facts about this disease, for instance, the reason for its onset on the ulnar side of the hand and its relative rarity in women. If these facts could be explained it might be possible for our knowledge of this disease to progress more rapidly in the future than it has in the past.

## "OSSEOSONOMETRY."

THOUGH some of the high-sounding words and phrases used in medicine to denote diagnostic procedures or laboratory investigations may be useful at the bedside or in the laboratory, many of them are an offence to the ear. Few lovers of the English language, for example, can contemplate with equanimity the horrible word hysterosalpingography which is used to indicate the combined adventures of the gynæcologist and the radiographer in the diagnosis of certain pelvic conditions in women. The coining of a new word, however, has the merit of arresting a reader's attention—as soon as he sees it he stops to discover what it is all about. The appearance of the word "osseosonometry" as the title of a recent article by Wilbert H. McGaw has had this effect.[1]

What McGaw means by this new word is clear from his first sentence: "Percussion over one end of a bone will set up audible vibrations that are clearly heard with a stethoscope at the other end." In the present article he deals with the use of percussion-auscultation in fractures of long bones. The article appears to be the first in a projected series, so that the use of "osseosonometry" in conditions other than fractures will probably be discussed by him on another occasion. That audible vibrations are set up in bone may be proved by listening with a stethoscope placed over the pubes while a medial malleolus is struck with the finger. As a matter of fact percussion and auscultation have been described as useful in the diagnosis of fractures by more than one writer in bygone years. McGaw gives references to articles by Andrews in 1903, by Vigevani in 1925, by Polera and Tripodi in 1929, and by Lippman in 1932. In the title of one of these articles reference is made to the use of the tuning fork. As far as can be discovered the term "osseosonometry" is new; since percussion and auscultation in the diagnosis of fractures are not widely used and since there should be a certain sphere of usefulness for the method, McGaw's paper with its striking title may reawaken interest in it.

At the outset McGaw states that there is no suggestion that the use of X rays shall be replaced in fracture work. He adds, however, that X-ray apparatus is not always available and that auscultation and percussion are. "The justification for the expense of an ambulance, a roentgen examination and hospitalization for an elderly lady who has tripped on a rug and injured her hip is usually obtained with the percussing finger and a stethoscope." In a fracture the quality of the sound wave produced by percussion is modified both by the superficial characteristics and changed pitch and intensity and also by the overtones of the smaller fragments—the ringing resonant quality is usually lost. When a tuning fork is used the bone is forced to vibrate at the same pitch as the tuning fork; the note is the same as that heard in the intact bone, except that the intensity is changed. The readings can be recorded in a sound-meter. Two types of fracture difficult to diagnose by percussion and auscultation are solidly impacted and greenstick or incomplete fractures. Further, if the ends of the fractured bone are not in contact no sound may be conducted. We can well imagine, as McGaw states, that confidence in this method comes only by experience. He gives a diagram of an apparatus with an amplifier and sound-meter, but is emphatic that this "elaborate apparatus" is not at all necessary for clinical use. Since simplicity is a desirable quality of all clinical procedures, medical practitioners should accustom themselves to the use of percussion and auscultation in the diagnosis of fractures. They never know when they may be so placed that X-ray apparatus is not available; they will seldom be unable to find a stethoscope. Whether they speak of "osseosonometry" or not will not matter very much.

[1] *Archives of Surgery*, August, 1942.

## PRISONERS OF WAR AND THE RED CROSS SOCIETY.

THE Australian Red Cross Society is faced with the enormous task of supplying food and comforts to Australian prisoners of war. It is stated that there are at least 23,000 Australians in enemy camps. Under the Geneva Convention the Red Cross Society is the only body which can give these men relief. To meet its obligations in this matter the society will need more than a million pounds *per annum*. The Red Cross Society has launched a prisoner of war street adoption scheme in which residents in streets of towns and suburbs "adopt" a prisoner of war by paying one pound a week that the Red Cross Society may supply him with the comforts which we may be quite certain are necessary. Already success has been gratifying. There is surely no reader of this journal who will not wish to support this effort. Where no groups have yet been formed medical practitioners can take a lead and urge their formation without delay.

## THE RETIREMENT OF DR. A. G. NICHOLLS.

FROM Canada comes news of the retirement of A. G. Nicholls, M.A., M.D., D.Sc., F.R.C.S., F.R.C.P.(C.), from the editorship of *The Canadian Medical Association Journal*. Dr. Nicholls has been Editor of our contemporary in Canada for the past twelve years and he has been compelled to relinquish his duties on account of ill health. Canadian medicine owes a great deal to him; the Executive Committee in its annual report which has just reached these shores, states that *The Canadian Medical Association Journal* throughout his editorship "has been enriched with a steady flow of clear, authoritative and timely contributions on a wide variety of subjects". Dr. Nicholls has shown a sympathetic and helpful interest in THE MEDICAL JOURNAL OF AUSTRALIA; this was shown in the warm-hearted message that he sent for publication in our Silver Jubilee Number in July, 1939. The Canadian Medical Association has elected him an honorary member and he has accepted the position of Consulting Editor to the association's journal. While we offer Dr. Nicholls our congratulations on his achievements in medical and literary fields and our earnest good wishes for the future, we are happy to know that he will still have some share in the work that he loves.

# Abstracts from Medical Literature.

## RADIOLOGY.

### Hæmorrhage from Gastritis.

EDWARD B. BENEDICT (*American Journal of Roentgenology*, February, 1942) concludes from a study of autopsy and surgical material that severe, even fatal, hæmorrhage may occur from gastritis alone in the absence of any other demonstrable pathological condition. Gastroscopic evidence of gastritis as the only source of hæmorrhage is presented in 42 clinical cases. Gastroscopic evidence of gastritis as a possible source of hæmorrhage is presented in 24 additional clinical cases associated with ulcer or with possible ulcer. Hæmorrhage may occur from superficial, atrophic, hypertrophic or post-operative gastritis. Radiologists and gastroscopists are generally agreed that negative results from an X-ray examination are of no value in the exclusion of gastritis; in the presence of negative radiological findings gastroscopy frequently demonstrates important changes in the gastric mucosa—namely, inflammation, erosions, superficial ulcerations and atrophic and hypertrophic changes. The superficial character of the erosions or ulcerations seen by gastroscopy makes them particularly difficult to demonstrate by X rays. Two cases have been observed gastroscopically in which there was no history of hæmatemesis or melena, and yet the gastric mucosa appeared inflamed and friable and was observed to bleed easily when touched with the tip of the gastroscope. Since normal gastric mucosa does not bleed during gastroscopic examination, such cases may be classed as cases of potential and perhaps subclinical hæmorrhage from gastritis. The converse is also true: four cases of hæmatemesis have been observed, in which both X-ray and gastroscopic examinations have given entirely negative results and no source of the hæmorrhage could be determined. Erosions and superficial ulcerations may heal in a few days, and even true peptic ulcer radiologically demonstrable may heal in a week. Since X-ray and gastroscopic examinations are often delayed for many days or weeks after the hæmorrhage, it is not surprising that its true source may not be determined.

### Coccidioidomycosis.

RAY A. CARTER (*Radiology*, June, 1942) discusses the radiological appearances of primary and secondary coccidioidomycosis. He states that the initial infection is most commonly pulmonary, and that this need not lead to the generalized disease. During an acute primary attack, the X-ray appearance of the chest may most closely resemble that seen in tuberculosis or pneumonia. When adenopathy is not evident, pneumonia is simulated, and the slow resolution may not exclude it. Obvious adenopathy requires consideration of tuberculosis or the mycoses. Sputum and sensitivity studies are indicated, and progress examination to note the rapidity and completeness of resolution. Residual strand shadows, discrete nodes and enlargement of the lymph nodes would be significant. Both tuberculosis and coccidioidomycosis are studied radiologically during the primary attack in only a minority of cases. Both are probably typed radiologically by cases of exceptional severity. Visible adenopathy, parenchymal lesions comparable in character, and at times *erythema nodosum*, are seen in both. Regression of visible lesions is slower in tuberculosis than in mycosis. Adenopathy in the adult, though not distinctive, heightens significantly the chance of mycosis. *Erythema nodosum* is frequently accompanied by hilar or mediastinal adenopathy. In the present state of knowledge, *erythema nodosum* may be considered to be a non-specific allergic manifestation, most often of tuberculous origin, but in endemic regions frequently also coccidioidal. It may also be due to other causes. The diagnosis will not rest upon the skiagram of the chest or the *erythema nodosum* itself. After the primary invasion, a number of patients, proportionately small but large in the aggregate, are destined to develop the serious secondary form. The factors of this liability are not yet clear. Coccidioidal granuloma may be either an acute progressive disease, fatal in a few weeks or months, or it may be chronic and protracted, with few or isolated foci of infection, ending in apparent recovery or disappearance of the patient from observation in relatively good condition. The chronic type may become acute, but many known fatal cases were acute from the beginning.

### Wounds of the Diaphragm.

PETER KERLEY (*British Journal of Radiology*, April, 1942) states that diaphragmatic hernia is a frequent sequel to gunshot or bomb-splinter wounds of the thorax and abdomen. The radiological findings which indicate injury to the diaphragm are as follows: (i) Invisibility of the injured dome. This is probably caused by eccentric contraction on either side of the tear. The presence of blood clot may also play a part in concealing the dome. (ii) Intermittent twitching movements visible on the screen. (iii) The presence of a pneumothorax if the entrance wound is thoracic. Conversely, if the entrance wound is abdominal, and a viscus has been penetrated, there will be a pneumoperitoneum. (iv) An extensive wound of the lung with hæmorrhage atelectasis and a little blood in the pleural cavity. As these patients are usually most comfortable in the semi-recumbent position, much of the blood will find its way into the abdominal cavity. This also accounts for the absence of a fluid level.

### The Sphenoidal Fissure.

KARL KORNBLUM AND GEORGE KENNEDY (*American Journal of Roentgenology*, June, 1942) state that the diagnostic value of any radiological sign is, in a measure, dependent upon the frequency of its occurrence or incidence. In an analysis of a recent series of 68 cases of verified brain tumour there was found an abnormality in the sphenoidal fissure in 19, an incidence of 27·9%. Unilateral sphenoidal fissure deformity in the majority of cases indicates the side of the lesion, and air studies are less frequently required in such cases. Because of the numerous variations that may occur in the appearance of the sphenoidal fissures and because of the difficulty in many instances of satisfactorily visualizing these structures, the radiologist should be extremely conservative in the interpretation of findings. When he is in doubt additional films should be made with variations in technique in order to demonstrate the fissures to their best advantage. The changes sometimes found are none too definite, and become significant only when accompanied by other signs. In the vast majority of cases there will be some alteration in the structure of the *sella turcica* or there may be a localized hyperostosis or an alteration in the homolateral optic foramen. Such changes along with a deformed sphenoidal fissure will easily establish the diagnosis and usually the localization of a tumour. Frequently, however, the other changes such as those involving the *sella turcica* are so slight that their significance is questioned. When accompanied by sphenoidal fissure deformity, however, the changes in the *sella turcica* assume greater importance and will usually lead to a positive diagnosis. Only occasionally is an alteration of the sphenoidal fissure found in the absence of some other radiological evidence of pathological change.

## PHYSICAL THERAPY.

### Use of Radium in the Treatment of Deafness by Irradiation.

E. B. EMERSON, A. H. DOWDY AND C. A. HEATLEY (*Archives of Otolaryngology*, June, 1942) appreciate the difficulty in many instances of securing radon for the treatment of peri-Eustachian lymphoid hyperplasia in cases of deafness and have designed appropriate instruments and have established a technique for the use of radium salt in place of the emanation. A special carrier is described having at its distal end two parallel chambers each of which carries one 12·5 milligramme radium needle, so that 25 milligrammes in all are employed. When a pair of the carriers and 50 milligrammes of radium are used in all, 12 minutes are required to treat both Eustachian tubes together, this time being considered sufficient to provide one-third of an erythema dose which is found to be necessary. Tonsillectomy and adenoidectomy are completed first. After healing, an examination is made with the naso-pharyngoscope to determine the condition of the tissues about the Eustachian orifice. If lymphoid hypertrophy or œdema and swelling are noted the patient is then given the radium treatment. Further examination is carried out two weeks later and the hearing is checked by audiometer at the end of one month and after six months. The Eustachian tube region usually appears normal and open after two to four weeks. In some cases a further application is required, but an interval of at least three months is allowed between treatments. Local anæsthesia is usually adequate. Nearly one hundred patients have been treated by the technique described. Audiograms and commentary on six cases selected at random from this group are published as indicating the average variations encountered. Considerable improvement or return to normal is demonstrated. The wide use of audiometer testing of school children is

advocated, as the onset of deafness is often insidious and its progress in the earlier stages can be detected in no other way.

### Volume Dosage in Deep X-Ray Therapy.

F. ELLIS (*British Journal of Radiology*, June and July, 1942) has been impressed for many years by the importance of "total energy absorption" as a factor which should be reckoned with in the planning and carrying out of radiation therapy. This is because of the profound effects on the general health of the patient inevitably caused by intensive radiation treatment for malignant conditions. Magneord and Happey have published accounts of the physical methods involved in the estimation of the total energy absorbed by the patient during the treatment. Happey has designed a method, in which a suitable graph is used, to make it possible for the clinician to estimate total energy absorption for himself in any given case. This amount, otherwise called "volume dose", is given by the product of the surface dose in *r* units, the maximum skin dosage rate divided by the size of the field used, the area of field in square centimetres, and the graph reading for the thickness of tissue concerned. The newer method of treating carcinoma of the lung is to direct the rays only at the region of the obstruction in the bronchus if that is possible and to use multiple small fields of application. Although in the case of a technique for carcinoma of the lung in which large fields are used, the dose given to the tumour is smaller, yet the volume dose or total energy absorption is 50% larger. It is a matter of experience that the technique used for œsophageal carcinoma and that used for the large field method for lung carcinoma are such as to strain the patient's general tolerance to the limit, and in each condition almost to an equal extent. Although the tumour doses are 6,000 *r* for the œsophagus, and 4,000 *r* for the lung tumours, and although eight small fields are used in one, and four large fields in the other, the volume doses are about the same. It seems that the threshold volume dose may be about $3{\cdot}3 \times 10^9$ ergs for treatment in the region of the chest. The value of the volume dose can be said to be threefold: (i) To compare the total energy absorption for various radiation techniques in individual cases with a view to choosing one technique in preference to another. (ii) To decide what is the threshold constitutional dose which should not be exceeded by any technique. (iii) To provide fundamental data relating the biological effects to the total energy absorption. An attempt has been made by the author to obtain the third of these desiderata by clinical experiments. He concludes that it is impossible to do this until more is known of the exact effect of X rays and $\gamma$ rays on tissue cells. The trial of histaminase as a remedy for radiation sickness is suggested for the first time because of its uniform success in these experiments.

### X-Ray Therapy of Diphtheria Carriers.

A. J. WILLIAMS AND T. M. FULLENLOVE (*American Journal of Roentgenology*, May, 1942) point out that diphtheria carriers are a serious economic and health problem to any community. Their treatment has not been sufficiently investigated. Various types of treatment have been advocated, such as the administration of vaccines, nasal douching, tonsillectomy, but these methods produce satisfactory results in little more than half the cases. From 1922 to the present day, the results of the X-ray therapy of diphtheria carriers have been published from time to time in America and Europe, and over 90% of good results have been reported. In the treatment of diphtheria carriers the aim is to eliminate the organism. This is accomplished (a) by restoring the mucous membrane to normal, (b) by immunizing the patient to the Klebs-Löffler bacillus. It has been shown by Desjardins and Hodges and Berger that the natural process of resistance to infection is accelerated by X-ray irradiation. The accumulation of old lymphocytes and leucocytes is destroyed and new cells are allowed to enter the field. Phagocytosis by the reticulocytes is stimulated, probably by opsonins or other factors liberated by the destroyed lymphocytes. As a result the hypertrophied and chronically inflamed lymphoid tissue is shrunken and dissolved. The technique of application of the X rays (which are generated at 200 kilovolts in this series) is given in detail. Reports of nine cases are given, and in seven of these, cultures could not be obtained after X-ray therapy alone; in the other two tonsillectomy was required in addition. It is advocated that all types of carrier should be treated by this method. Immunization should be continued as at present, and its use spread to cover adults who are carriers and who react to the Schick test.

# British Medical Association News.

## SCIENTIFIC.

A MEETING of the Queensland Branch of the British Medical Association was held at the Hospital for Sick Children, Brisbane, on August 1, 1942. The meeting took the form of a series of clinical demonstrations by members of the staff of the hospital.

### Plumbism.

DR. S. F. MCDONALD showed a girl, aged six years, who had been admitted to hospital on June 29, 1942. She gave a history of having had measles one month before. It was stated that she had been ill for the last five months, with pain in the arms and legs, and that foot and wrist drop had developed. The child had always had long nails and did not bite them. Her family lived in an old house.

Examination of the upper limbs revealed some weakness of the flexors of the arms, and the reflexes were exaggerated. Examination of the lower limbs disclosed wasting of the muscles of the thighs and legs. The muscles were almost in a state of clonus; weakness of the dorsiflexors of the feet was present. Dr. McDonald said that on June 29 no wrist drop was present; foot drop was present, with the characteristic gait. No apparent sensory loss had occurred. He noted the "bottle" appearance of the legs, with symmetrical wasting below the lower third of the thigh.

In view of the history of weakness of the upper limbs, followed by recovery, plumbism was the most likely diagnosis; but muscular atrophy of the Charcot-Marie-Tooth type had to be remembered. Certain investigations were carried out. On July 6 the urine contained 0·06 milligramme of lead per litre. On June 29 an X-ray examination of the spine revealed rudimentary cervical ribs, but no other abnormality. On June 30 an X-ray picture of the long bones revealed a pathological degree of condensation in the ends of the diaphyses. This was particularly well noticed in the lower ends of the diaphyses of the radius and ulna. The radiological appearances suggested plumbism. On June 30 a full blood count gave the following information: the erythrocytes numbered 3,240,000 and the leucocytes 14,500 per cubic millimetre; the hæmoglobin value was 62% and the colour index was 0·9; of the leucocytes, 69% were neutrophile cells, 29% were lymphocytes and 2% were eosinophile cells. The platelets were normal. Examination of a blood film disclosed anisocytosis, hypochromia and polychromasia. Punctate basophilia was present in 17,000 cells out of each 1,000,000.

On July 28 a blood count gave the following information: the erythrocytes numbered 3,250,000 and the leucocytes 5,300 per cubic millimetre. The hæmoglobin value was 61% and the colour index was 0·9; of the leucocytes, 43% were neutrophile cells, 48% were lymphocytes and 9% were eosinophile cells; the platelets were normal. Polychromasia was present, and punctate basophilia was found in 10,000 out of each 1,000,000 cells. On June 30 the urine was examined microscopically and found to contain a few pus cells, an occasional erythrocyte and occasional hyaline and granular casts.

### Tuberculous Adenitis.

Dr. McDonald then showed a girl, aged five years, who had a swelling on the right side of the neck; it had first been noticed five months previously and was gradually becoming larger. The swelling was painless and the child's health was good. On palpation, three large glands and several smaller ones could be felt. No other glands in the body were enlarged. The spleen was palpable, but no other abnormalities were to be found on examination. An X-ray examination of the chest revealed no lesion in the lung fields, and a blood count disclosed that the leucocytes numbered 14,600 per cubic millimetre, 14% being monocytes. The Mantoux test produced a positive reaction with a dilution of 1 in 1,000. Close questioning of the child's mother revealed that between the ages of four months and one year the baby was taken every Sunday to visit its grandfather, "who was coughing up his lungs with consumption" at a hospital.

Dr. McDonald submitted that in view of all the facts there could be little doubt that the enlarged glands in this child's neck were tuberculous, and that the source of infection was probably human.

Major Morris, of the United States Army, remarked that the incidence of cervical glandular tuberculosis in New York State had decreased enormously as a result of the widespread pasteurization of milk.

Dr. Felix Arden commented on the rarity of tuberculosis among Brisbane children; out of approximately 5,000 annual admissions to the hospital for sick children, there had been for some years an average of only five or six cases *per annum* of tuberculosis of all kinds, chiefly of bones and joints.

### Bone Cyst.

Dr. C. E. Tucker showed a boy, aged six and a half years, who had been admitted to hospital on September 22, 1941; it was stated that three days previously his right arm had been twisted at school, and the arm had been sore since. On examination, a uniform swelling of the lower end of the right radius was seen. X-ray examination disclosed a large solitary bone cyst of the lower end of the right radius, and an incomplete pathological fracture.

On September 23 the cyst was opened; it was found to have a thin bony wall, and to be filled with clear serous fluid. The wall of the cyst was composed of cancellous bone, no fibrous tissue being evident. The cavity was lightly curetted and chips of bone were dropped into it. The fracture was completed and the limb put up in a plaster cast. An X-ray examination on that day disclosed a dorsal tilt of the lower radial fragment. On October 26 an X-ray film showed that union of the fracture was taking place. Five months later union was complete, but the bone cyst had recurred and increased in size. In April and May, 1942, a course of deep X-ray therapy was given to the arm, without noticeable effect.

On July 24 the cyst was reopened. The appearance was the same as previously; the walls were thinner, and clear serous fluid filled the cavity. On September 16 the swelling over the radius was diminishing in size and was of more solid consistency. X-ray examination revealed increased density in the walls of the cyst and diminished density of the graft, the one blending more with the other. The cavity was again curetted, and a graft from the shaft of the tibia about four inches long was doubled on itself and forced into the cyst cavity.

Dr. Tucker said that the pathology of the condition appeared to be a response of the marrow cavity to damage or stimuli—mechanical, inflammatory, neoplastic or metabolic—and the condition seemed to be of a benign nature. The usual explanation offered for the formation of such lesions did not seem adequate in this case; such conditions were usually explained as the result of an extensive hæmorrhage into the bone cavity, with the resorption and organization of the hæmatoma and development of granulation tissue, or as the result of the formation of a cavity by increased pressure within the marrow spaces, the blood circulation being impaired, with consequent osteoclastic resorption of bone and degeneration of the fibrous bone marrow. The first operation had left the part in an ideal condition for bone formation; yet in spite of this, the bony fragments which were projecting into the cyst cavity were absorbed, the fracture united and the cyst went its destined way, increasing in size and undergoing further thinning of the cortex. The osteoclastic bone-destroying elements appeared to take on neoplastic characters, destroying the osteoblasts.

### Bladder-Neck Obstruction.

Dr. D. C. Fison, on behalf of Dr. M. G. Sutton, showed a boy, aged eleven years, to illustrate the severe renal damage which followed a stricture of the urethra causing back-pressure effects on the kidneys. The boy now had all the signs and symptoms of chronic azotæmic nephritis, with retinitis, high blood pressure, poor renal reserve and uræmia.

The condition had begun years earlier, when at the age of two years the boy had difficulty in micturition; this was followed by repeated attacks of cystitis. On cystoscopy, the prostatic portion of the urethra was found to be ballooned, but no obstruction to the passage of the cystoscope under general anæsthesia was encountered, though a catheter passed while the child was conscious was temporarily arrested in the urethra. A urethrogram revealed ballooning of the prostatic portion of the urethra and an apparent constriction of the *sphincter urethræ membranaceæ*.

On account of the fact that no congenital valves were seen on cystoscopic examination, although an undoubted obstruction was present when the child was conscious, it was suggested that the obstruction was a nervous spasm of the sphincter. At operation a large calculus was removed suprapubically, and drainage by that route was continuing, to allow the kidneys to recover from the effects of back pressure.

Dr. F. W. Lukin expressed doubt that a nervous spasm could ever last long enough to cause such severe damage, and considered that the obstruction was probably a congenital valve which was not always visible cystoscopically.

### Congenital Obliteration of the Bile Ducts.

Dr. A. E. Paterson showed a female baby, aged eight weeks, who had been admitted to hospital on the previous day. She had been jaundiced since birth; the motions had always been white and the urine bright golden-yellow. The depth of the jaundice appeared to fluctuate somewhat. Apart from this the baby did not seem ill. She was breast fed and well nourished, and at the time of the meeting weighed eleven pounds. She was deeply jaundiced, and both liver and spleen were enlarged. The motions were white and the urine dark yellow; it almost certainly contained bile, although the response to the iodine test was indefinite. The blood serum gave an immediate direct reaction to the Van den Bergh test; the Wassermann test produced no reaction, the erythrocyte fragility test produced a normal result and a complete blood examination revealed no abnormality.

Dr. Paterson showed the baby as suffering from congenital obliteration of the bile ducts, and he mentioned some of the theories of the causation of this condition. He emphasized that the jaundice never became so deep as in the adult with obtrusive jaundice, and he drew attention to the infant's good general condition. Although the ultimate prognosis was hopeless, and although the enlargement of the liver and spleen showed that some damage had already taken place, it was usual for these babies to live to the age of six or nine months.

Dr. C. E. Tucker and Dr. A. E. Lee both considered that surgical exploration was justifiable, in the view of the possibility that the obliteration might be affecting the common bile duct only, in which case an anastomotic operation would perhaps be successful.

### Jaundice of the New-Born.

Dr. F. Arden showed a male baby, aged twelve weeks, who had been for the past five weeks under the care of Dr. H. Mathewson at the Maternal and Child Welfare Centre. The baby was one of twins, the other one being healthy and well. Weighing four pounds at birth and estimated to be two weeks premature, the child became jaundiced soon after birth and failed to thrive. When he was admitted to the Maternal and Child Welfare Centre at the age of seven weeks he was deeply jaundiced and emaciated, and weighed only four pounds six and a half ounces. Bile was present in the fæces. He did well at the centre, gaining in weight and gradually losing his jaundice, until about the age of ten weeks; then, within a few days, the motions became white and the urine dark yellow, and jaundice reappeared. At the time of the meeting the baby weighed six pounds five ounces, about one and three-quarter pounds below the expected weight, and he was pale and jaundiced. His motions were quite devoid of bile and the urine was the same colour as that of Dr. Paterson's patient. The liver was enlarged to two fingers' breadth below the costal margin, and the spleen was just palpable. His blood serum gave an immediate direct reaction to the Van den Bergh test. A blood count gave the following information: the hæmoglobin value was 80% and the erythrocytes numbered 4,200,000 per cubic millimetre; 5% of the erythrocytes were reticulocytes, and occasional erythroblasts were seen in the blood film.

Dr. Arden said that although this baby now had obstructive jaundice and looked very like Dr. Paterson's patient, he actually contrasted strongly with her. To reconstruct the story, it seemed that during the child's first seven weeks of life he had suffered from *icterus gravis neonatorum*, not quite severe enough to prove fatal. Between the ages of seven and ten weeks his condition seemed to be improving. The jaundice (due to liver damage and hæmolysis, and not to biliary obstruction) was fading, and the baby was gaining in weight. Then, at the age of ten weeks, obstructive jaundice had supervened and still persisted. The sudden onset of obstructive jaundice in such cases was due to clogging of the small intrahepatic bile ducts with bilirubin debris. There had been two other such cases in

the hospital in the past four years; one child's ducts became "unblocked" spontaneously after ten days; in the other instance the obstruction was permanent. The clues to this baby's illness were the occasional erythroblast and the 5% of reticulocytes seen in the blood film. Unless spontaneous release of biliary obstruction occurred the outlook for the child under discussion was hopeless, and surgery could not be of any assistance.

# Correspondence.

## BLOOD PRESSURE AND INFECTIONS.

SIR: The following report of a case may be of interest in relation to blood pressure and infections.

On February 3, 1942, Mr. H., aged thirty-five years, came for examination as having been rejected for military service. His systolic blood pressure was 210 millimetres of mercury and he had sugar in the urine. His apex beat was just outside the nipple line and he was suffering from tachycardia. He had several dead teeth and pyorrhœa. He was put on one grain of thyreoid extract three times a day. The teeth were extracted a few at a time and he was given diathermy through his heart for seven treatments. Here are the records of his blood pressure: February 13, 190 millimetres of mercury, systolic; February 17, 170; February 20, 165; February 23, 170; March 2, 150; March 9, 145; April 9, 160; May 11, 150. He came back on September 25 telling me that he had been called up again and that he was passed physically fit and was shifting cargo on the wharves and never felt better in his life. He had had no return of sugar and his blood pressure was 142, systolic.

Yours, etc.,

SYDNEY PERN.

Ballarat,
Victoria,
October 20, 1942.

## HIRSCHSPRUNG'S DISEASE EXTENDING TO THE ANAL CANAL.

SIR: I have read with interest the report of the above case by Mr. J. G. McGlashan in THE MEDICAL JOURNAL OF AUSTRALIA, August 23, 1941. I regret that so long a time has elapsed before writing on this subject, but the journal in question has only just reached me. I trust that those interested in this subject can recall the details of the case. The most striking feature of it is the problem of the cause. From a description of the autopsy, it is apparent that a constriction present in the ano-rectal region was responsible for the colonic changes. Microscopic section of the constricted area, revealed "in the submucosa intense round-cell infiltration . . . and an apparent increase of fibrous tissue internal to the muscularis". It is a handicap not to have access to these specimens, but from the description, certain deductions can be made.

1. The thickening of the ano-rectal region is apparently that described by Miles (1919) as the pecten band. Reference to his writings and to those of others on this subject is made in an article by Fine and Lawes (1940), where the pecten band is further described, and discussion entered into as to its nature and formation. One of the outstanding facts demonstrated in the work done in preparing this article, was that the fibro-muscular deposit in submucosa of anal canal is a normal structure, and that it becomes hypertrophied under certain conditions.

2. It would seem that the cause of the colonic condition in this case was not achalasia, that is, a neuro-muscular incoordination. The obstruction was due to hypertrophy of the fibro-muscular layer normally present in the anal submucosa. This layer is quite distinct from the sphincters of the ano-rectal region. This hypertrophy, called by Miles pectenosis, occurs in a variety of conditions, that is, hæmorrhoids, fissure, advanced years, chronic constipation *et cetera*, and it is also frequently seen in conjunction with enlargement of anal papillæ. This latter condition would seem to have been present in this case, as in the autopsy report it is stated "in which [that is, the obstructing ring] several taggy polypoid projections were noted". In considering the nature of the obstruction, it is interesting to note that Lawrence Abel, lecturing on this subject, has stated that he has seen cases of intestinal obstruction from an extreme degree of pectenosis.

There are many other points that come to mind, but it is not desirable to discuss the subject further at this stage. The question of pectenosis has been much debated in proctological circles, and agreement does not seem to have been reached. This case is of considerable interest and may well throw considerable light on the subject. I hope that Dr. Jose, Professor Cleland and Mr. McGlashan will allow me to see the specimen and sections after the war, and I would be very grateful if a slide or photograph or sketch could be sent to me, so that I could study the case further.

Yours, etc.,

C. H. W. LAWES (Captain).

NX34921 Captain C. H. W. Lawes, A.A.M.C.,
6 Australian General Hospital,
c.o. No. 1 A.I.F. Base Post Office,
Abroad.
November 4, 1941.

### Bibliography.

J. Fine and C. H. Wickham Lawes: "On the Muscle Fibres of the Anal Submucosa, with Special Reference to the Pecten Band", *The British Journal of Surgery*, Volume XXVII, 1940, page 723.

W. Ernest Miles: "Observations upon Internal Piles", *Surgery, Gynecology and Obstetrics*, Volume XXIX, 1919, page 497.

# Naval, Military and Air Force.

## CASUALTIES.

ACCORDING to the casualty list received on November 2, 1942, Lieutenant-Colonel N. M. Eadie, A.A.M.C., of Melbourne, previously reported missing, is now reported prisoner of war.

According to the casualty list received on November 3, 1942, Major Thomas Rhodes Matson, A.A.M.C., has been placed on the seriously ill list.

According to the casualty list received on November 3, 1942, Major John Finch Akeroyd, A.A.M.C., is reported missing.

# Australian Medical Board Proceedings.

## NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Allen, Loraine Georgina, M.B., B.S., 1942 (Univ. Sydney), Bathurst District Hospital, Bathurst.

Allen, Trevor, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Arnot, Eleanor Hattie, M.B., B.S., 1942 (Univ. Sydney), Thalassa, Terrigal.

Baker, Joan Helen Gertrude, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Barder, Kenneth Rothwell, M.B., B.S., 1942 (Univ. Sydney), Royal North Shore Hospital, Saint Leonards.

Barrett, Cedric George, M.B., B.S., 1942 (Univ. Sydney), Royal South Sydney Hospital, Zetland.

Bennett, Noela Wynifred, M.B., B.S., 1942 (Univ. Sydney), Brisbane General Hospital, Brisbane, Queensland.

Bennett, Winston Noel Chevalier Gerard, M.B., 1942 (Univ. Sydney), Lewisham Hospital, Lewisham.

Birkbeck, Enid Mary, M.B., B.S., 1942 (Univ. Sydney), Brisbane General Hospital, Brisbane, Queensland.

Bird, Eric Lloyd, M.B., 1942 (Univ. Sydney), Orange Base Hospital, Orange.

Blomfield, Edwin Cordeaux, M.B., B.S., 1942 (Univ. Sydney), Hornsby and District Hospital, Hornsby.

Blows, Elizabeth Beryl, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Sydney.

Bourke, Richard Ulick, M.B., B.S., 1942 (Univ. Sydney), Newcastle General Hospital, Newcastle.

Bowen, Janet Mora Campbell, M.B., B.S., 1942 (Univ. Sydney), St. George District Hospital, Kogarah.

Brown, Merna Marie, M.B., B.S., 1942 (Univ. Sydney), Lewisham Hospital, Lewisham.

Brown, Shirley Le Vance, M.B., B.S., 1942 (Univ. Sydney), Rachel Forster Hospital, Redfern.
Browne, Gordon William, M.B., B.S., 1942 (Univ. Sydney), Newcastle General Hospital, Newcastle.
Carter, Lindsay Vaughan, M.B., B.S., 1942 (Univ. Sydney), Ryde District Hospital, Ryde.
Christie, Amiel Colin, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Cockburn, George Robert, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Cohen, Douglas Harry, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Collin, Robert, M.B., B.S., 1942 (Univ. Sydney), Prince Henry Hospital, Little Bay.
Coyle, Edward Frank, M.B., 1942 (Univ. Sydney), Balmain District Hospital, Balmain.
Cranswick, George Noel Harvard, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Creswick-Jackson, Noel Ernest, M.B., 1942 (Univ. Sydney), Newcastle General Hospital, Newcastle.
Cullen, John Thomas, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Cunynghame, Donald Dryborough, M.B., B.S., 1942 (Univ. Sydney), 29, Harrow Road, Auburn.
Curtin, Bryan Austin David, M.B., B.S., 1942 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.
Darvall, Anthony Roger, M.B., B.S., 1942 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
De Salis, Eric James Fane, M.B., 1942 (Univ. Sydney), Royal Hobart Hospital, Hobart, Tasmania.
Desgrand, Vincent Geoffrey Scriven, M.B., 1942 (Univ. Sydney), District Hospital, Dubbo.

## Obituary.

### JAMES LIVINGSTONE THOMPSON.

We regret to announce the death of Dr. James Livingstone Thompson, C.B.E., which occurred on October 30, 1942, at Castlemaine, Victoria.

### A MEMORIAL TO THE LATE WILLIAM JOHN YOUNG.

A MEMORIAL fund has been opened in Melbourne in order to purchase a portrait of the late Professor William John Young to be hung in the school of biochemistry in the University of Melbourne. It is thought that many graduates of the University of Melbourne and others who knew and valued his work will wish to subscribe. A portrait painted by his friend Charles Wheeler is available for purchase. Should the fund be over-subscribed an additional memorial will be placed in the biochemistry school. Subscriptions may be sent to the secretaries of the Branches of the British Medical Association in the several States.

## Medical Appointments.

Dr. Walter John Westcott Close has been appointed a Member of the Dental Board of South Australia.

## Books Received.

"War Injuries of the Chest", edited by H. Morriston Davies and Robert Cope; 1942. Edinburgh: E. and S. Livingstone. 7¼" × 5", pp. 139, with illustrations. Price: 6s. net.

"A Handbook on Diseases of Children Including Dietetics and the Common Fevers", by Bruce Williamson, M.D. (Edinburgh), F.R.C.P. (London); Third Edition: 1942. Edinburgh: E. and S. Livingstone. 7¼" × 5", pp. 375, with many illustrations. Price: 12s. 6d. net.

"Surgery of Modern Warfare", edited by Hamilton Bailey, F.R.C.S.; Volume II, Second Edition: 1942. Edinburgh: E. and S. Livingstone. Crown 4to, pp. 530, with 544 illustrations. Price: 40s. net.

## Diary for the Month.

Nov. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Nov. 10.—Tasmanian Branch, B.M.A.: Branch.
Nov. 13.—Queensland Branch, B.M.A.: Council.
Nov. 17.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 18.—Western Australian Branch, B.M.A.: Branch.
Nov. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 26.—South Australian Branch, B.M.A.: Branch.
Nov. 26.—New South Wales Branch, B.M.A.: Branch.
Nov. 27.—Tasmanian Branch, B.M.A.: Council.
Nov. 27.—Queensland Branch, B.M.A.: Council.
Dec. 1.—New South Wales Branch, B.M.A.: Executive and Finance Committee. Organization and Science Committee.
Dec. 2.—Western Australian Branch, B.M.A.: Council.
Dec. 3.—South Australian Branch, B.M.A.: Council.
Dec. 3.—New South Wales Branch, B.M.A.: Special Groups Committee.
Dec. 8.—New South Wales Branch, B.M.A.: Ethics Committee.
Dec. 8.—Tasmanian Branch, B.M.A.: Branch.
Dec. 10.—New South Wales Branch, B.M.A.: Branch.
Dec. 11.—Queensland Branch, B.M.A.: Annual Meeting.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

*New South Wales Branch* (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

*Victorian Branch* (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

*Queensland Branch* (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

*South Australian Branch* (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

*Western Australian Branch* (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

## Editorial Notices.

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